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NOTES

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETINGS

Monday, 8 January — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for evening — Members Night.

GROUP MEETINGS

(8 p.m. at National Herbarium unless otherwise stated.)

Wednesday, 17 January—Microscopical Group.

Thursday, 25 January — Field Survey Group meeting in Conference Room, National Museum at 8 p.m. (Member's Night).

Note — F.S.G. Camp will be held AFTER the January Meeting; for details contact Group Secretary.

Thursday, 22 February — At above venue (Taxonomy).

Monday, 5 February—Marine Biology and Entomology Group. 8 p.m., at National Museum, Library Conference Room.

Wednesday, 7 February—Geology Group.

Thursday, 8 February—Botany Group.

F.N.C.V. Excursions

Saturday, 10 March-Monday, 12 March—Labour Day Week-end. There will be a combined excursion to Shepparton with other clubs. A bus has been chartered and accommodation booked for the week-end. The cost for the coach and bed and breakfast at the motel will be \$24.00 per person. Further details next month.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

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Assistant Editor: G. Douglas

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Female Wandering Albatross (*Diomedea exulans*) incubating at Half Moon Bay,
Macquarie Island.

ANARE photo — Ken G. Simpson.

Coastal Conservation Problems at Seaford

by PETER CULLEN*

One of the few extensive areas of Tea-tree vegetation remaining on the eastern shore line of Port Phillip is found at Seaford. This strip is some 5.6 kilometres long, about 100 metres wide, and is designated as permanent Crown Reserve for public purposes.

Landward of the sandy beach are low sand dunes forming the first of a series of parallel sand ridges in the area. These ridges are composed of wind-blown sand resting on beach deposits (Whincup, 1944). Kananook Creek flows between two such ridges, and the Melbourne-Frankston railway line is built upon one of them.

A wide variety of vegetation is found on the area, as shown by the vegetation list compiled by Mr. J. Kirkpatrick and Dr. E. C. F. Bird of the Geography Department at the University of Melbourne which is appended to this report.

In 1927, a report on the condition of Tea-tree around Port Phillip by Pescott, noted that the Tea-tree in this area was abundant. A field excursion to the area also in 1927 (C.D., 1927) reports that the vegetation was healthy, and described the track through the area which is still in use. A similar excursion in 1947 (French and Lee) noted that borer species were doing great damage to the Banksia trees, many of which were dying and falling over.

At present the Banksias on the reserve are in a very poor state due to the actions of the borers. The Tea-tree is also now over-mature in some areas, and since there is little natural

revegetation, is dying out. Due to car parking and the foot traffic to and from the beach, young Tea-trees and Banksias in the reserve have little chance of developing.

The Seaford Reserve, including its beach area, is intensively used during the summer months. The Beach Usage Survey of the Port Phillip Authority (1970) showed that 65% of those using this beach had travelled over 10 miles, a greater proportion than for any other beach on the eastern shoreline. There are several reasons for this popularity, but one significant one is the shade provided by the trees.

However, this popularity itself has led to considerable destruction of the coastal vegetation, especially on the seaward, or primary dune. This vegetation is not able to withstand the trampling of the thousands of people who use the area, and consequently areas of bare sand have been eroded by the wind. Blow-outs have been created in the dune, and the sand blown further inland, where it has killed other vegetation by either directly sand blasting it, or by burial.

Another significant cause of damage to vegetation behind the primary dune has been the random and haphazard parking of cars. Branches, and indeed trees, have been removed to allow cars into spots, or to assist in freeing vehicles bogged in the sand.

*Research Officer, Port Phillip Authority.

The deterioration of the vegetation on the Seaford Reserve has been going on for some time, and there have been several reasons for this:

- (a) Car parking on the Reserve.
- (b) Trafficking of people across dunes, leading to wind erosion.
- (c) Direct sand and salt blast on vegetation following erosion of the foredune.
- (d) Natural ageing of Tea-tree with conditions being unsuitable for regeneration.
- (e) Activities of boring organisms in Banksias.

An examination of aerial photographs of the area taken in 1931, 1946 and 1972 show the steady rate of deterioration. In 1931 the foredune was dissected, but there were few large blow-throughs of sand. By 1946 vegetation on the landward side of the foredune had begun to deteriorate, and the vegetation had become noticeably thinner in some areas, but there were still few bare expanses of sand. By 1972 the vegetation on the landward side of the foredune had deteriorated still further, and there were some substantial blow-throughs of the dune. There are now some large ex-

panses of bare sand, some of which reach through almost to the Nepean Highway.

RESTORATION

The Alternatives —

If the existing character of the area is to be retained, it is essential to re-establish vegetation on the eroded primary dune, to prevent further erosion.

To achieve this, people will have to be kept off the new vegetation, at least while it is establishing.

The question at Seaford was whether the existing irregular topography of the dune could be stabilized by re-vegetation or whether it would be necessary first to fill the blow-throughs with sand to prevent the eddying of wind from killing any new vegetation.

On an ocean beach at Kilcunda, Sluiter (1966) found that it was not sufficient just to plant marram grass in the blow-throughs. The grass did not establish and Sluiter considered the reason for this was the exposure to wind. He found it was necessary to plug the blow-through with sand, caught by slat fencing, before grass could be established.

Mitchell (1971) suggests that as a general principle it is necessary first to seal a breach, and recreate the primary dune. This can be done by sand-trap fencing, or by earthmoving equip-

Plate 1. Trafficking of people removes vegetation, allowing wind to erode the dune.

photo: Author





◀ Shoreline

◀ Nepean Hwy.



Plate 2.

Aerial
Photographs of
part of Seaford
Reserve —

Upper, 1931
Cwth. Archives

Middle, 1946
*Crown Lands
& Survey, Vic.*

Lower, 1972
*Crown Lands
& Survey, Vic.*

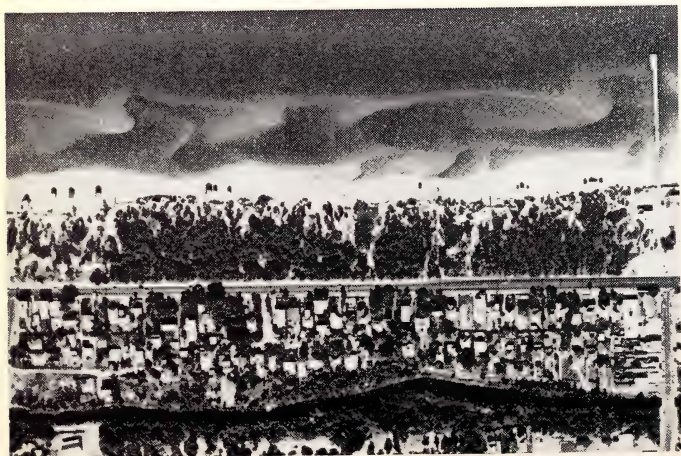


Plate 3. Marram grass planted to stabilize incised dune.

photo: Author



ment. However, this conclusion was based on experience in dune stabilization on Victoria's ocean coasts, which are exposed to stronger wind and wave energy than the shores of Port Phillip or Westernport Bays. In these more sheltered situations vegetation may well be sufficient to stabilize an eroding foredune.

At Seaford, it was decided to attempt the more sensitive approach and to stabilize the existing incised foredune. Other reasons for this were—

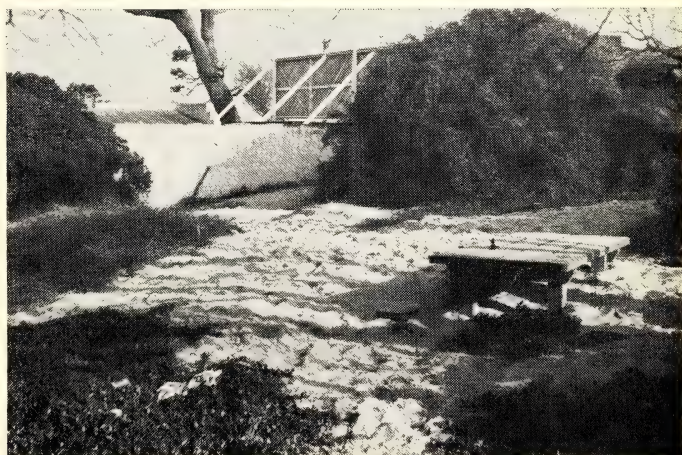
- (i) There is considerable vandalism in the area, and it was

considered that sand trap fencing would be damaged or stolen.

- (ii) Mechanically reforming the dune would inevitably cause excessive damage to the existing vegetation, since sand would have to be pushed back from the rear of the dune. There is insufficient sand on the beach to plug the breaches.
- (iii) There is no geological evidence that there was ever a smooth, unbroken dune along the coast in this area.

Plate 4. Sand blown through the breaches of the dune buries vegetation and facilities.

photo: Author



- (iv) If this approach should fail, it would still not be too late to bring in earth-moving equipment to push the sand back to the dune.

THE RESTORATION PROGRAMME

The Port Phillip Authority, with the co-operation of the Seaford Foreshore Committee of Management, has undertaken a restoration project on part of the Seaford Reserve, immediately south of the Seaford Pier.

Surfaced tracks have been provided across the foredune at regular intervals. The area between these tracks has been temporarily fenced, and planted to marram grass. Banksia trees have also been planted in some sections.

The co-operation of visitors to the Seaford Reserve is vital to the success of this project, and to the long-term conservation of this coastal area.

Such conservation is worthwhile, since this is a small surviving remnant of the type of coastal vegetation that used to be extensive around the low sandy sectors of the Bay.

There are many plants and animals,

including a wide variety of birds that occupy such a coastal habitat. It is important to preserve this habitat close to the City of Melbourne, since it is of value scientifically, and is important as an area for the teaching of ecology and botany.

It is popular as a recreational area, for walking, picnicking and nature study as well as providing shade on hot days.

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Plate 5. Fenced walkways provide access to the beach.

photo: Author

APPENDIX

Vegetation List of Seaford Foreshore (1971) compiled by Mr. J. Kirkpatrick and Dr. E. C. F. Bird.

Species	Seaward Foredune	Lee Foredune	Foredune to Road
GRAMINEAE			
<i>Spinifex hirsutus</i>	X		
<i>Ehrharta longifolia</i>			
<i>Ehrharta erecta</i> *		X	X
<i>Sporolobus capensis</i> *			X
<i>Ammophila arenaria</i> *	X		
<i>Lagurus ovatus</i> *	X	X	X
<i>Danthonia geniculata</i>			X
<i>Briza maxima</i> *		X	
LILIACEAE			
<i>Asparagus asparagoides</i> *		X	X
PROTEACEAE			
<i>Banksia integrifolia</i>	X	X	X
POLYGONACEAE			
<i>Muehlenbeckia adpressa</i>			X
CHENOPODIACEAE			
<i>Rhagodia baccata</i>	X	X	X
AIZOACEAE			
<i>Carpobrotus rossii</i>	X	X	
<i>Tetragonia implexicoma</i>	X	X	X
RANUNCULACEAE			
<i>Clematis microphylla</i>		X	
CRASSULACEAE			
<i>Crassula sieberana</i>	X		
LEGUMINOSAE			
<i>Acacia longifolia</i>	X	X	X
RUTACEAE			
<i>Correa alba</i>	X	X	X
POLYGALACEAE			
<i>Polygala myrtifolia</i> *	X		
MYRTACEAE			
<i>Leptospermum laevigatum</i>	X	X	X
EPACRIDACEAE			
<i>Styphelia (Leucopogon) parviflorus</i>	X	X	X
APOCYNACEAE			
<i>Alyxia buxifolia</i>			X
RUBIACEAE			
<i>Coprosma repens</i> *		X	X
COMPOSITAE			
<i>Olearia axillaris</i>	X	X	
<i>Crysanthemoides monilifera</i> *			X
<i>Helichrysum parailium</i>	X		

*Introduced species

reptiles of victoria-8

by HANS BESTE

Plate 15

Morethia lineocelatus — Garden Skink.

A small brownish skink of variable markings.

Length: to $4\frac{1}{2}$ inches.

Short, tapering head. Eyelids not movable. Ear-opening distinct. Five fingers and five toes. Two distinct colour variations exist. Upper olive-brown. A dark brown dorso lateral stripe is underlined by a pale cream stripe, extending from snout to hindlegs. One form has distinct rows of small white spots, edged with black, along the back. These are absent from the other form. The dorso lateral stripe of this form is usually darker. Under pale cream.

Habitat: among debris, low vegetation.

Best distinguishing features — non-movable eyelids, spots or dorso lateral stripe.

Plate 16

Phyllurus milii — Thick Tailed Gecko.

A colourful gecko with an unusually shaped tail.

Length: to almost 6 inches.

Head very large, distinct from body. Mouth large and rounded. Eyes large, silvery — like molten lead. Yellow upper eyelid. Tail greatly enlarged — carrot shaped. Basic colour chocolate-brown with enlarged yellow or white tubercles, often in bands across body and tail. Under pale pink.

Habitat: under bark and rocks in lightly timbered country. At times in rabbit warrens.

Best distinguishing features — chocolate colour, shape, carrot-like tail.



PLATE 15



PLATE 16

The Otway Coast of Victoria, Australia

by EDMUND D. GILL* AND NANCY MCNEILL†

The Otways have a rocky coast which consists of Lower Cretaceous felspathic sandstones (arkoses) and siltstones laid down in freshwater lakes and swamps. The vegetation was rich, so that coal was formed. The climate was cold, and so the vertebrate animal life was limited. In the northern part of Australia, rocks of the same age and ecology preserve the remains of large dinosaurs and other animals. Although so well exposed in coastal and valley sections and road cuts, rocks of this age in Victoria have yielded of terrestrial vertebrates only one claw of a small dinosaur and one small reptilian humerus. However, fossil fish are known from a number of places, especially at Koonwarra (Waldman 1971) in South Gippsland, where a King Crab (Riek and Gill 1971), insects, conchostracans (Talent 1965) and other arthropods were also found.

ORIGIN OF THE OTWAYS

The Lower Cretaceous rocks of the Otways are structurally a block of country uplifted above the adjacent sectors (a horst), so that they are mountainous and scenic. The Ocean Road was built to give people ready access to the seascapes and holiday environments of this attractive coast as well as for the needs of residents. How this coast was formed has also exercised the observational and interpretative skills of a number of noted workers. Papers by Jutson (1949, 1954), Edwards (1962), and Hills (1971), for example, are widely known around the world.

One widely debated problem is to what extent rocky shore platforms are due to the sea cutting into the land, and to what extent the result of the air and the rain rotting the rocks. On the latter view, the sea is chiefly a transport mechanism removing the results of subaerial decomposition. The former view stresses the power of the sea to abrade the rocks.

*Deputy Director, National Museum of Victoria.

HORIZONTAL SEACUTS INTO STEEP HILLSIDES

We think it is significant that on this steep coast the work of the sea results in more or less *flat* platforms. They are thus related in their geometry to the horizontal action of the sea, rather than to the action of weathering which follows the steep hillslopes. The terrain inland is steep, with deep valleys and high hills. At the coast the land often descends very precipitously to the shore, but however steep the land, the shore platforms are always more or less flat. The surf is one of Nature's power tools, that chisels out the land to form a bevel more or less at the level of the sea. It is true that the soil and weathered rocks are easier to erode than the fresh rock, but none the less the sea cuts through the zone of decomposition into the hard fresh rock below. The sea performs an enormous amount of work, both in eroding the rocks and in removing the resultant debris.

†Dorman Street, Lorne, Victoria.

CHEMICAL AND PHYSICAL FACTORS

Then why is it that some students of rocky shores have made so much of the factor of subaerial weathering, and thought of the sea as no more than an endless belt to carry away the results of rock weathering? Why do they think that the cutting of the coast is a chemical rather than a physical process? The answer is to be found in the tropical countries. In hot, humid climates like Singapore, Puerto Rico, Morocco and Hawaii (in all of which important studies have been carried out), the chemical effects are dominant. The rocks rot with remarkable rapidity, and the sea sweeps away the debris. Thus high cliffy coasts are less frequent in tropical countries, and sandy beaches are a characteristic coastal form. The steep coasts of Hawaii are due to volcanic activity; on both the general terrain and along the shore the rocks are shaped by the intense tropical weathering such as we never see in Victoria. The steepness of New Guinea is due to exceptionally strong earth movements.

So it seems to us that the dominance of chemical weathering, or of the physical action of the sea, is a matter of ecology. In the hot wet tropics the former dominates, while in the Mediterranean type of climate as in Victoria, and in colder places, the latter dominates. They are not alternative explanations. Both are present everywhere, but their proportion changes with climate. Chemical weathering is certainly present on the coasts of Victoria, but it is slight compared with what happens in places like Hawaii.

CHEMICAL DECOMPOSITION

The rocks outcropping on the Otway Coast are arkose (felspathic sandstone) and siltstone. The former is greenish-grey when unweathered, with chlorite, calcite, iron oxide or

zeolite cement, and rarely a few other minerals. The siltstone is bluish-grey or grey when unweathered. These rocks turn brown on weathering, due to the chlorite changing to limonite (Edwards and Baker 1943). Where the horizontal shore platforms are cut into the steep hills, the rocks are unweathered as far as can be determined in hand specimens. However, elevated parts of the supratidal platform that are comparatively free of erosion are darker on the surface, and possess some mobilization of secondary calcite and limonite. Only slight chemical weathering is evident on the shore platforms, thus contrasting with the rapid breakdown of rocks to be seen in the tropics.

PHYSICAL EROSION

Where the rocks are homogeneous and massive, broad areas of smooth platform result (Gill 1972a). However, horizons of concretions are developed in places, and other variables that result in differential erosion (Gill 1972b). Plate 1 was taken to illustrate in summary the processes of this kind commonly encountered on the Otway Coast. This photograph shows part of the wide platform at Point Grey, Lorne, south of the pier and near Hird Street. Five kinds of differential erosion are represented in this one small area:

1. *Excavated joint plane.* Diagonally across the photograph is a gutter or rill of V-shaped cross-section but with very well rounded edges. It is spanned by the 3 ft. ruler folded to half that length. This structure is due to the excavation of a joint. When the sediments that form these rocks were folded and uplifted, the stresses generated frequently found relief in joints (Beasley 1971) which are fracture planes *without* displacement (faults are such *with* displacement). In some places joints have no effect on

the flat surface of a shore platform. In others they are lines of weakness along which erosion occurs as in the site illustrated. In yet others, secondary minerals have strengthened the joints so that they stand out above the rest of the platform. A small amount of the secondary decomposition can be seen in the right-hand end of the joint as shown in Plate 1. Not far from the site of the photograph is an area of ferruginized joints that form a system more or less at right angles, so that this piece of platform looks like a giant waffle iron. The ironstone is apparently from the oxidation of pyrite.

2. "*Cannon-ball*" Concretions. The two most prominent features in Plate 1 look like miniature volcanoes with deep craters. They are sites whence spherical concretions (locally called "cannon-balls") have been removed by wave action. The cavity on the left is 7 cm wide and 2.5 cm deep, while that on the right has a diameter of 15.2 cm and a depth of 12.7 cm. The concretions are formed by crystallisation of calcium carbonate (Edwards and Baker 1943). Where this occurs evenly, a spherical concretion results. Such may have concentric layers that only show up during weathering. Plate 2 illustrates the concentric layers in an exceptionally large concretion observed on the coast south-west of Von Mueller Creek on 12th June 1971. Two outer layers about 8 cm thick have been oxidized and partly broken away. The surface of the core was oxidized too, but was still quite solid. Onion weathering is seen sometimes on this coast, but the layers are very thin, and not as thick as shown in Plate 2.

That the removal of the concretions at Point Grey (Plate 1) leaves evenly-shaped craters suggests some discontinuity existed between the concretion

and the matrix. The masses of rock shaped like volcanoes that carry the craters are not necessarily mineralized also, but are areas that were protected from erosion by the concretion above, when it was there. They are asymmetric, and this orientation matches that of the other concretions, which seems to be due to the dip of the strata.

3. "*Sausage*" Concretions. In the lower left of the photograph forming Plate 1 are elongate concretions, some of which are in contact end to end. Locally these are called "sausages", because they remind people of strings of sausages. It is true that some are similar to sausages in size and shape, but others belonging to this category may be as much as 20 cm in diameter, which is a rather large sausage!

The area of the photograph is unusual in having a number of different types of concretions close together. More often a particular type is characteristic of a given area, one place having all "cannon balls" and another all "sausages". Concretions are not found everywhere, but occur in horizons which must be zones that possessed special conditions allowing their formation. It will be interesting to discover if some of these zones are continuations of the same layer through the folds of the country rock, or whether each zone is an isolated occurrence. The zones follow the bedding, so probably were formed before the beds were folded.

Near Von Mueller Creek, concretions proved to be a useful clue to distinguish between boulders on the shore platform that had tumbled from road works, those which were derived from the cliff, and those which had been quarried from the shore platform (or below it) by the swirling seawaters. The road rocks were oxidized to a light brown colour, while the rest

Subscriptions Now Due

The Field Naturalists Club of Victoria is administered by a relatively small number of honorary office-bearers.

The growth of the club and the expansion of its activities, particularly in connection with the production of the *Victorian Naturalist*, are continually adding to the burden of work.

It is therefore requested that fees and subscriptions be paid as promptly as possible, in order to help lighten some of this burden. The financial year commences on 1 January, 1973.

If you will not be paying your fees at one of the forthcoming general meetings, please remit them by post, using the form provided on the reverse side of this leaf.

This procedure will save office-bearers' time, and expense, in sending out reminder notices.

PLEASE ATTEND TO THIS MATTER NOW

You may help further by passing the following leaf on to an acquaintance who is not a member of the F.N.C.V. or a subscriber to the *Victorian Naturalist* but who might be interested in either.

NOTES:

1. Membership fees for the year 1973 are as follows:

Ordinary Members	\$7.00
Country Members	\$5.00
Joint Members	\$2.00
Junior Members	\$2.00
Junior Members receiving <i>The Victorian Naturalist</i>	\$4.00
Subscribers to <i>The Victorian Naturalist</i>	\$5.00
Affiliated Societies	\$7.00
Life Membership (reduction after 20 years' membership)	\$140.00
(Ordinary, and country members receive the <i>Victorian Naturalist</i> free of any further charge.)	

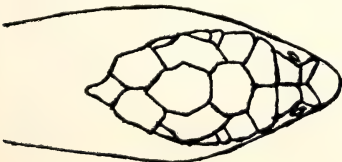
2. The scheme of supporting membership was introduced so that those who are able and willing to do so might help club finances. You are invited to become a supporting member by making a voluntary addition to the normal annual fee of any sum you choose, from \$1 upward. Details relating to supporting members and their payments are regarded by the treasurer as confidential, and no distinction or extra privilege is bestowed on the members concerned.

(To be removed)

ADDENDUM

Vol. 89: No .7, p. 186.

A space to the right of the text under Frasers Legless Lizard should contain this illustration.



Field Naturalists Club of Victoria

**FORM FOR RENEWAL OF MEMBERSHIP OR OF
SUBSCRIPTION TO THE "VICTORIAN NATURALIST"**

(To be used by existing members or subscribers for payment of fees)

Name(s).....

Address.....

.....

.....

(Please indicate if there is a joint member)

Mr. D. E. McINNES

Hon. Treasurer, F.N.C.V.

129 Waverley Road, East Malvern, 3145

Dear Sir,

Please find enclosed the sum of \$, to cover annual
membership fees
subscription to the *Victorian Naturalist* for the year 1973. Please
enter this sum as follows:

Membership fees \$

Supporting membership \$

Subscription to *Victorian Naturalist* \$

Yours faithfully,

.....

Field Naturalists Club of Victoria

APPLICATION FORM

To be used by new members or subscribers.

(Cross out parts which are not applicable)

I wish to subscribe to the *Victorian Naturalist* for 1973. Please post it monthly to the address below.

Ordinary

I wish to apply for Country membership of the Field Naturalists Club
Junior
of Victoria.

My full name and address is:

Mr.

Mrs.

Miss

[illegible]

I enclose the sum of \$ _____ in payment of the year's fee.

Date / /1973.

Signature.....

(Cut along this line)

The Field Naturalists Club of Victoria

ELECTION OF OFFICE-BEARERS

Under the terms of the Articles of Association, nominations for elections to Council at the Annual General Meeting must be received by the Secretary two calendar months before the Annual General Meeting, i.e., by the January General Meeting. I therefore call for nominations for the following positions:—

President

Vice-Presidents (2)

Secretary

Treasurer

Assistant Secretary

Assistant Treasurer

Editor

Librarian

Assistant Editor

Assistant Librarian

Excursion Secretary

Residual Councillors (5)

Any financial member may nominate for any of the above positions. Nominations must be proposed and seconded by financial members, and nomination forms must be signed by the nominee, the proposer and the seconder.

It is most important that nominations be received for all positions as the Club cannot function effectively without a complete, enthusiastic and effective Council.

R. H. RIORDAN.

Honorary Secretary.

(See over)

The Field Naturalists Club of Victoria
AN INVITATION TO PERSONS INTERESTED IN AUSTRALIAN
FAUNA, FLORA AND COUNTRYSIDE

If you have not already an affiliation with the F.N.C.V., you may apply to the club either for membership or for regular subscription to the *Victorian Naturalist*.

These are some of the club's activities:

- General meetings each month, with informative, illustrated talks by prominent naturalists. These are held on the second Monday of each month, at the National Herbarium, South Yarra.
- Meetings of study groups comprising those with specialized interests such as geology, botany, microscopy, entomology, native fauna, etc.
- Organized excursions led by nature experts, to places of interest, both near and far.
- The maintenance of a large lending library of nature books and magazines.
- The publication monthly of the *Victorian Naturalist*, a well-illustrated nature magazine produced for the general reader as well as the expert. This is issued free to all members.

Membership is available to any person interested in nature; it is not necessary to have any specialized knowledge.

Membership Fees for the year 1973 are:

Ordinary members (living within 20 miles of G.P.O. Melbourne)	..	\$7.00
Country members (living over 20 miles from G.P.O., Melbourne)	..	\$5.00
Junior members (under 18 years of age)	\$2.00

Non-members may subscribe to the "Victorian Naturalist" for \$5.00.

If you are interested in either membership of the club or subscription to the *Victorian Naturalist*, please complete the appropriate parts of the form on the reverse side of this leaf and post it to:

Honorary Secretary, F.N.C.V.,
National Herbarium, South Yarra, Victoria 3141.

(Cut along this line)

The Field Naturalists Club of Victoria
ELECTION OF OFFICE-BEARERS

Nomination Form

I,.....of.....

.....hereby nominate.....

for the position of.....

Seconded by.....of.....

I hereby accept nomination as a candidate for the above position.

Signed.....Date.....

(To be removed)



Plate 1:

Surface structures on the arkose shore platform at Point Grey, Lorne, Victoria, showing various kinds of concretions, joint erosion and honeycomb weathering.



Plate 2:

Large concretion with thick exfoliation layers on shore platform S.W. of Von Mueller Creek, Otway Coast, Victoria.

Photos E. D. Gill.

were grey and those from the cliff commonly contained concretions. So a brown boulder on the shore was from the road works above, especially if it had a drill hole through it!

4. *Irregular Concretions*. In the top right-hand area of the photograph (Plate 1) are numerous irregular concretions. Having no well-defined shape, they have earned no local name. A number of these concretions dip into the matrix in the direction of the lower right of the photo, following the bedding. The supports for the spherical concretions extend in that direction. The sausage-like concretions have a similar dip because at one end they stand above the general platform surface, while at the other they are disappearing into it. In all the concretions, a definite orientation is therefore discernible, which must be connected with the conditions of deposition of the lithifying calcite.

5. *Honeycomb Weathering*. In the top left-hand corner of the photograph (Plate 1) is an area of alveolar or honeycomb weathering, sometimes called tafoni (Jennings 1968). Such is characteristic of the supratidal arkose platforms on this coast. The development of honeycomb on sea walls of known date of construction (e.g. 1943) shows that the process is more rapid than originally thought. Thus honeycomb formation is a significant process in the complex weathering of the arkose outcropping on the coast. It reduces the higher areas on supratidal platforms that otherwise would not be so rapidly eroded.

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Nominations for Council: 1973.

In accordance with the provisions of the Articles of Association, nominations for election to Council at the Annual General Meeting must reach me by 30th January, 1973. Nominations must be signed by the Nominee, and must be proposed and seconded by Club members. Any member may be nominated for any position on Council.

The Wildflowers of the Flat Rock Area Northern Grampians

by

BRIAN AND BEVERLEY TIMMS*

ABSTRACT

121 species of wildflowers are recorded from a 30 hectare area at Flat Rock. Four distinct habitats are recognised: the rock gardens of Flat Rock, a dense shrubby zone at the base of the rocks, a *Micromyrtis* swamp and a woodland dominated by Brown Stringybark and divisible into two areas by topography and different dominate shrubs. The flowering period for each species is given and a wildflower calendar constructed.

Introduction

The Grampians are well known for their wildflowers and the springtime spectacle must be the best in eastern Australia. In previous years we had wandered over wide areas looking at flowers, but in 1971-72 we tried a different approach. We visited the same area regularly over a year not only to see other than spring flowering species, but also in order to collect data to construct a wildflower calendar. The site chosen was Flat Rock, initially because of the attractive rock gardens there, but the variety of vegetation types proved it to be an interesting site.

The Area

The study area (Fig. 1) is small, being about 30 hectares in size and lies on the low saddle between Mounts Stapleton and Zero in the north of the Grampians. The saddle is bound on the north and south by inwardly sloping quartzose sandstone. It is composed of siliceous sand, the soils are skeletal and the slopes gentle. There is a slight gradient away from the mountain edges (marked by the edge of the outcropping sandstone) and to the east and west from the watershed.

Basically the area is covered with low open forest but the height and density of the shrub layer is variable. Around the bases of the rocks and

near the watercourses (Zone B on Fig. 1) it is 1-3m high and dense. The characteristic shrub is *Thryptomene calycina*. The watershed is marked by a change in vegetation; to the west (Zone D) the average shrub height is near 1m while on the eastern side (Zone E) shrubs are even lower and more spaced. Zone C is swampy and is dominated by low bushes of *Micromyrtis ciliatus*. There is an interesting ecotonal area around the swamp. The area around the dam still bears the damage done during its construction for there are bare areas and vigorous recolonization by wattles.

Flat Rock (Zone A) is a bare area of dipping strata, flattish at the top and sloping uniformly to the NE and disappearing under the sands of the saddle. Between the dipping rock beds there are long clefts running in a SW-NE direction and it is parts of these that plants have managed to gain a foothold and "rock gardens" have resulted.

Climate

The northern Grampians experience warm, mainly dry summers, and cool-mild, wet winters. Stawell is probably the most representative weather station for Flat Rock and there the annual range in mean monthly temperature is from 8.1°C to 20.8°C (Table 1). The

*3 Fairland Ave., North Clayton, 3168.

average rainfall is 20.6" with a winter maximum (Table 1). Because of its topography, temperatures at Flat Rock are probably a little milder than at Stawell and rainfall higher. During the study period conditions were not average: the winter-spring was cooler and much wetter than normal, the summer wetter, and the autumn warmer. Hence it is not surprising that on all the trips save the autumn one, the weather was overcast and usually wet!

Methods

The study area was visited on ten occasions in 1971-72 — 3 July, 7 August, 5 September, 1 October, 23 October, 20 November, 1 January, 27 February, 22 April and 3 June — spaced so that observations were more frequent in spring and further apart in summer-autumn. On each visit the procedure was to move through the area in a fixed pattern, so that the same path was followed each time. The route was positioned so that at

least all the showy shrubs of the area were seen but rare small ones or orchids could have been missed. The abundance of each species was scored on a five point scale. The extent of flowering, that is whether the species was in full flower, or only a proportion of the flowers were open, was noted and also scored on a five point scale. Hence the observations were subjective, but comparable from one trip to the next.

Species that could not be readily identified in the field were identified by the National Herbarium, from fresh or pressed samples. Only wildflowers in the common usage of the term were studied; thus grasses, sedges and the like, and trees were excluded, except for the main species on Flat Rock.

The Flora

There are at least 800 species of vascular plants native to the Gram-pians (Cochrane et al, 1968) and of these about 350 (260 "wildflowers") are known in the vicinity of the Flat

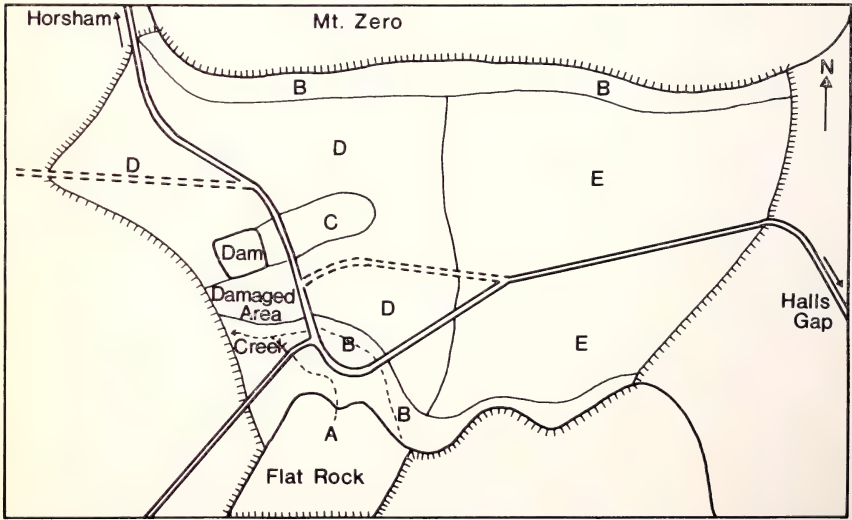


Figure 1. The Flat Rock-Mt. Zero saddle. The study area is bounded by the hatched line. The zones (see text) are indicated by "A", "B", "C", "D", and "E". Drawing not to scale.

Rock area (Beaglehole, personal communication). The present work records 120 species of "wildflowers" in the 30 ha study area, which comprises only a small part of Beaglehole's census area. Had the area been enlarged many further species would have been added to the list.

Table 2 lists the species by family and records their relative abundance and distribution in the study area. No one family dominates the flora. Except for the Orchidaceae (17 species) the most common families have about the same number of species in each: Epacridaceae (12 species), Papilionaceae (11), Proteaceae, Mimosaceae, Myrtaceae and Compositae (9 each) and Liliaceae (7).

No one of the 121 species grow in all five zones. In fact many (47) are restricted to one, and of these, the most interesting are those on Flat Rock; this is discussed later. Zone D with 83 species is floristically the most diverse and Zone C (13 species) the least diverse.

The most obvious species in each zone are:

- A. *Thryptomene calycina*, *Leptospermum nitidum*, *Acacia stricta*, and *Micromyrtis ciliatus*.
- B. *Thryptomene calycina*, *Banksia marginata* and *Styphelia pinifolia*.
- C. *Micromyrtis ciliatus*.
- D. & E. *Styphelia behrii* (mainly D), *Brachyloma daphnoides* (mainly D), *Hibbertia* spp, *Ixodia achillioides* (mainly E), *Tetratheca ciliata* and *Xanthorrhoea australis* (mainly E).

The tree cover in zones D & E is provided by the Brown Stringybark, *Eucalyptus baxteri* and the Long-leaf Box *E. goniocalyx*. The Oyster Bay Pine, *Callitris rhomboidea* and the Dwarf She-oak, *Casuarina pusilla* are also present. In Zone B the eucalypts are accompanied by the Mountain Grey Gum *E. cytellocarpa*. At the top

of Flat Rock there are a few stunted specimens of the latter and the Oyster Bay Pine.

The "Gardens" of Flat Rock

These are of two basic types and are probably edaphic climaxes rather than one being a seral stage of the other. The first grows in the sloping clefts between the dipping strata. Characteristic plants include *Thryptomene calycina*, *Leptospermum nitidum*, *Acacia stricta*, *Eriostemon difformus*, *Dodonaea cuneata*, *Meleleuca decussata*, *Styphandra glauca* and *Drosera planchonii*.

The second is confined to less steeply sloping parts of the rock, is not necessarily associated with a crevice, has more moss-bound soil and is dominated by *Micromyrtis ciliatus*. Other plants include *Burchardia umbellata*, *Dichopogon strictus*, *Haloragis mexicana*, *Briza maxima* and a variety of orchids; although these sometimes grow in the first type of garden as well.

A few species tend to grow isolated from the gardens, usually from small crevices containing a minimum of soil. Most obvious are *Epacris impressa* var *grandiflora* and *Helichrysum obcordatum*.

At the top and bottom of Flat Rock the two garden types are not so apparent. This is associated with the flatness and soil accumulation and by the intrusion of typical Zone B species. The main intruders are *Brachyloma ericoides*, *Hibbertia* spp, *Calythrix alpestris*, *Styphelia pinifolia* and *Pultenaea scabra*.

In addition to the showy species on the rock there are a number of smaller, less obvious forms. Data on these is incomplete but the commoner species are *Carpobrotos modestes*, *Calandrinia calytrata*, *Centrolepis strigosus*, *Levenhookia dubia* and *Rutidosus multiflora*.



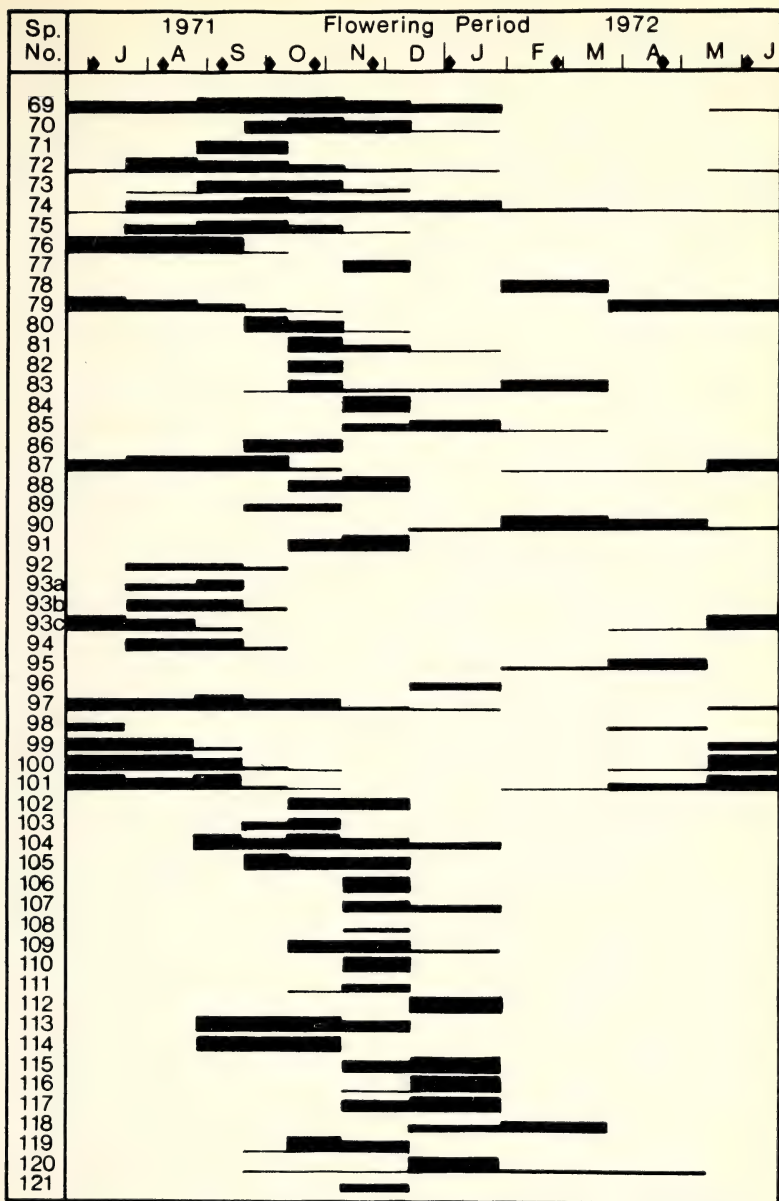


Figure 2. Flowering period and intensity of flowering for the 121 species of wildflowers growing in the study area. The key to species is given in Table 2. The diamonds on the top row indicate the dates when data collected.

Flowering Times

The flowering period and intensity of flowering for each species is shown in Figure 2. It is probably inadvisable to apply, in detail, this calendar to areas much beyond Flat Rock, for from random observations it was noted that most species flower earlier there than at sites further south and more elevated in the Grampians. Further the wet, overcast conditions during much of the study period probably affected timing and intensity of flowering (e.g. for sundews and sunorchids to cite obvious examples), so that events could be different in other years. For instance, limited observations in the dry spring of 1972 suggested some differences (e.g. very few orchids) to that observed in 1971 spring. But this is Nature and material for further fascinating studies.

While the wildflowers at Flat Rock are most spectacular, in both variety and abundance in September-October, the commonly acknowledged best months for the Grampians; there are significant numbers of species blooming at other times of the year, and even in the hot dry months of February, March and April some species flower. A convenient starting point in the cycle is in June when a number of showy species, e.g. Juniper Wattle, Desert *Baekea*, Grampians *Thryptomene*, Grampians Heath and all three species of *Styphelia* begin to flower, or flower more intensely. There are no significant additions to this list in July, but in August many others, e.g. Sallow Wattle, Greenhoods, Mountain *Grevillea*, Silky *Grevillea*, Leafless Bitter Pea, the *Hibbertias* and other heaths, become obvious. September is wattle month and in October (and to a certain extent in September) the most obvious species are Waxlip Orchids, the two *Grevilleas*, the two *Hakeas*, Black-eyed Susan, the *Hibbertias*, the Fringe-wattles, Flame Heath and

Creamy *Stackhousia*. Most heaths finish flowering by November and from then till January various peas and daisies dominate the scene. Other showy species in this period include the Daphne Heath, Slender *Conospermum*, Erect Guinea-flower and Totem-poles. Of the few species which flower in February-March-April, the two *Banksias* and Common *Correa* are the most obvious.

Only one species, the Erect Guinea-flower blooms all the year, but a number including Thyme Spurge, Bundled Guinea-flower, Grampians *Thryptomene*, Common Beard-heath and Pine Heath flower for long periods. Four species — Fringed Hare-orchid, Mitchell Wattle, Wirilda, Prickly Tea-tree — flower twice a year, or at least did so in 1971-72.

Impact of Man on the Flat Rock Area

Flat Rock has been a picnic area for many years and in good weather is visited by scores of people each weekend. Taken over a year however, there are relatively few visitors and most confine their activities to the picnic area and to Flat Rock. Hence most of the Flat Rock-Mt. Zero area is in apparent pristine condition, the exceptions being in the immediate vicinity of the parking area, on parts of Flat Rock where some of the interesting weathering patterns have been damaged, and near the swamp and dam. The latter damage must have been inflicted some years ago during construction work, but it is slowly healing.

Towards the end of 1971 the Forests Commission improved the picnic and parking area and cut a walking track to Mt. Zero. This is a worthwhile contribution to forest recreation facilities, but the siting of the track through the swamp, also through the best orchid area in the vicinity and its poor construction in steep areas is ill-advised.

Still, with thoughtful and educated visitors, and hopefully the percentage of these is increasing, there is a good chance of the area retaining its original glory, despite lacking the legal protection associated with National Park status, a status which surely some of the Grampians deserve.

Acknowledgements

We wish to thank the staff at the National Herbarium for identifica-

tions, the Bureau of Meteorology for supplying weather data and Kevin Taylor for field assistance.

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TABLE I
Mean Monthly Air Temperature and Rainfall at Stawell

		J	A	S	O	N	D	J	F	M	A	M	J
Air Temp. in °C	Long-term mean 1971-72	8.1	9.4	11.6	14.0	16.6	19.2	20.4	20.8	18.6	14.6	11.4	8.9
		8.8	9.2	11.4	13.8	16.3	18.9	20.0	21.0	19.2	15.7	12.2	8.0
Rainfall in points	Long-term mean 1971-72	242	238	227	168	142	146	79	137	95	147	201	237
		270	218	306	235	339	184	118	226	55	184	131	149

TABLE 2

The species of wildflowers, their abundance and distribution in the Flat Rock area of the northern Grampians.

Latin name	Common name	Species number	Relative Abundance*	Distribution†
LILIACEAE				
<i>Anguillaria dioica</i>	Early Nancy	1	xx	ACD
<i>Burchardia umbellata</i>	Milkmaids	2	xx	A
<i>Chamaescilla corymbosa</i>	Blue Squill	3	xxx	C
<i>Dianella revoluta</i>	Spreading Flax Lily	4	xx	AD
<i>Dichopogon strictus</i>	Chocolate Lily	5	xx	AD
<i>Stypandra glauca</i>	Nodding Blue Lily	6	xx	AD
<i>Xanthorrhoea australis</i>	Austral Grasstree	7	xxxx	DE
HYPOXIDACEAE				
<i>Hypoxis glabella</i>	Yellow Star	8	x	C
ORCHIDACEAE				
<i>Acianthus reniformis</i>	Gnat Orchid	9	xx	ABD
<i>Caladenia carnea</i>	Pink Fingers	10	x	ABD
<i>C. cucullata</i>	Hooded Caladenia	11	u	D
<i>C. dilatata</i>	Fringed Spider O.	12	x	nCDE
<i>Corybas diemenicus</i>	Purple Helmit O.	13	x	nC
<i>Diuris maculata</i>	Leopard O.	14	x	ABDE
<i>Glossidea major</i>	Waxlip O.	15	xxx	nCDE
<i>Leptoceras fimbriatum</i>	Fringed Hare O.	16	xxx	DE
<i>Pterostylis longifolia</i>	Long-leaf Greenhood	17	xx	ABD
<i>P. nana</i>	Dwarf G.	18	x	AD
<i>P. parviflora</i>	Tiny G.	19	u	D

*Key to symbols u = uncommon x = present xx = fairly common

xxx = common xxxx = very common

†See text for meaning of symbols "A", "B", "C", "D" and "E". "nC" indicates the species occurs in the ecotone surrounding the swamp. "R" indicates that it grows conspicuously on the roadside.

<i>P. vittata</i>	Banded G.	20	u	AD
<i>Thelymitra antennifera</i>	Rabbit's Ears	21	u	C
<i>T. aristata</i>	Scented Sun-orchid	22	x	D
<i>T. chasmagama</i>	Globe-hood S-o.	23	u	D
<i>T. ixoides</i>	Dotted S-o.	24	u	D
PROTEACEAE				
<i>Banksia marginata</i>	Silver Banksia	25	xxx	ABDE
<i>B. ornata</i>	Desert B.	26	xx	DE
<i>Conospermum patens</i>	Slender Conospermum	27	xx	DE
<i>Grevillea alpina</i>	Mountain Grevillea	28	xxx	DE
<i>G. aquifolium</i>	Holly Grevillea	29	xx	D
<i>Hakea rostrata</i>	Beaked Hakea	30	xx	D
<i>H. sericea</i>	Silky H.	31	xxx	DE
<i>Isopogon ceratophyllus</i>	Horny Cone-bush	32	xx	DE
<i>Persoonia juniperina</i>	Prickly Geebung	33	x	E
SANTALACEAE				
<i>Leptomeria aphylla</i>	Leafless Current Bush	34	x	BD
FICOIDACEAE				
<i>Carpobrotus modestus</i>	Inland Pigface	35	x	A
PORTULACEAE				
<i>Calandrinia calyptrata</i>	Pink Purslane	36	x	A
RANUNCULACEAE				
<i>Clematis microphylla</i>	Small-leaved Clematis	37	u	D
LAURACEAE				
<i>Cassytha glabella</i>	Tangled Dodder-laurel	38	xx	BDE
DROSERACEAE				
<i>Drosera peltate</i>	Pale Sundew	39	x	CD
<i>D. planchonii</i>	Climbing S.	40	xx	AB
<i>D. spathulata</i>	Spoon-leaf S.	41	x	C
<i>D. whittakeri</i>	Scented S.	42	xxx	ACDE
PITTOSPORACEAE				
<i>Bursaria spinosa</i>	Sweet Bursaria	43	u	nC
MIMOSACEAE				
<i>Acacia brownii</i>	Heath Wattle	44	u	ER
<i>A. gunni</i>	Ploughshare W.	45	x	BD
<i>A. longifolia</i>	Sallow W.	46	xx	B
<i>A. mitchelli</i>	Mitchell W.	47	u	D
<i>A. myrtifolia</i>	Myrtle W.	48	x	D
<i>A. pycnantha</i>	Golden W.	49	xxx	BDR
<i>A. retinoides</i>	Wirilda	50	x	D
<i>A. stricta</i>	Hop W.	51	xx	A
<i>A. ulicifolia</i>	Juniper W.	52	xx	DE
PAPILIONACEAE				
<i>Davesia brevifolia</i>	Leafless Bitter-pea	53	xx	DE
<i>Dillwynia glaberrima</i>	Heathy Parrot-pea	54	xxx	DE
<i>D. sericea</i>	Showy P-p.	55	xx	BDE
<i>Gompholobium huegelii</i>	Pale Wedge-pea	56	x	E
<i>Hovea heterophylla</i>	Hovea	57	xx	E
<i>Indigofera australis</i>	Austral Indigo	58	u	D
<i>Phyllota pleurandroides</i>	Heathy Phyllota	59	x	DE
<i>Platylobium obtusangulatum</i>	Common Flat-pea	60	xx	BDE
<i>Pultenea hispida</i>	Hairy Bush-pea	61	xxx	DE
<i>P. laxiflora</i>	Loose-leaf B-p.	62	xx	DE
<i>P. scabra</i>	Rough B-p.	63	xxx	BDE
RUTACEAE				
<i>Correa aemula</i>	Hairy Correa	64	xx	B
<i>C. reflexa</i>	Common C.	65	xx	DE
<i>Eriostemon difformis</i>	Small leaf Waxflower	66	xx	A

TREMANDRACEAE					
<i>Tetradlea ciliata</i>	Black-eyed Susan	67	xxx	DE	
POLYGALACEAE					
<i>Comesperma calymiga</i>	Blue-spike Milkwort	68	x	D	
EUPHORBIACEAE					
<i>Phyllanthus hirtellus</i>	Thyme Spurge	69	xx	DER	
STACKHOUSIACEAE					
<i>Stackhousia monogyna</i>	Creamy Stackhousia	70	xx	D	
SAPINDACEAE					
<i>Dodonaea cuneata</i>	Hop bush	71	xx	AB	
DILLENIACEAE					
<i>Hibbertia fasciculata</i>	Bundled Guinea-flower	72	xx	DE	
<i>H. sericea</i>	Silky G-f.	73	xx	ADE	
<i>H. stricta</i>	Erect G-f.	74	xxx	DER	
<i>H. virgata</i>	Twigy G-f.	75	x	DE	
VIOLACEAE					
<i>Hyabanthus floribundis</i>	Shrub Violet	76	u	D	
THYMELAECEAE					
<i>Pimelea linifolia</i>	Slender Rice-flower	77	u	D	
LOBELIACEAE					
<i>Lobelia gibbosa</i>	Tall Lobelia	78	u	D	
MYRTACEAE					
<i>Baeckea crassifolia</i>	Desert Baeckea	79	x	E	
<i>Calytrix alpestris</i>	Snow Myrtle	80	xxx	ABCD	
<i>C. tetragonia</i>	Common Fringe-myrtle	81	xx	DE	
<i>Kunzea parvifolia</i>	Violet Kunzea	82	x	C	
<i>Leptospermum juniperinum</i>	Prickly Tea-tree	83	xxx	BDE	
<i>L. nitidum</i>	Shiny Tea-tree	84	x	A	
<i>Melaleuca decussata</i>	Totem-poles	85	x	AC	
<i>Micromyrtus ciliatus</i>	Fringed Heath-myrtle	86	xx	AC	
<i>Thryptomene calycina</i>	Grampians Thryptomene	87	xxx	ABnC	
ARALIACEAE					
<i>Astrotricha asperifolia</i>	Star-hair	88	x	B	
HALORAGACEAE					
<i>Haloragis meziana</i>	Raspwort	89	x	ACD	
EPACRIDACEAE					
<i>Astroloma humifusum</i>	Canberry Heath	90	xx	CD	
<i>Brachyloma daphnoides</i>	Daphne H.	91	xxxx	DE	
<i>B. ericoides</i>	Brush H.	92	xx	ABD	
<i>Epacris impressa</i> "red"	Common H.	93a	u	DE	
<i>E. impressa</i> "white"	Common H.	93b	xx	DE	
<i>E. impressa</i> var <i>grandiflora</i>	Grampians H.	93c	x	A	
<i>Leucopogon ericoides</i>	Pink Beard-heath	94	xx	DE	
<i>L. glacialis</i>	Twisted B-h.	95	x	DE	
<i>L. rufus</i>	Ruddy B-h.	96	x	DE	
<i>L. virgatus</i>	Common B-h.	97	xxx	DE	
<i>Monotoca scoparia</i>	Prickly Broom-heath	98	x	DE	
<i>Styphelia adscendens</i>	Golden Heath	99	x	DE	
<i>S. behrii</i>	Flame Heath	100	xxxx	DE	
<i>S. pinifolia</i>	Pine Heath	101	xxx	ABD	
LABIATAE					
<i>Prostanthera denticulata</i>	Rough Mint-bush	102	x	AB	
<i>P. rotundifolia</i>	Round-leaf M-b.	103	u	ABD	
SOLANACEAE					
<i>Anthocercis frondosa</i>	Large-leaf Ray-flower	104	u	DR	
LENTIBULARIACEAE					
<i>Polypompholyx tenella</i>	Pink Bladderwort	105	x	C	

RUBIACEAE				
<i>Galium gaudichaudii</i>	Rough Bedstraw	106	x	D
CAMPANULACEAE				
<i>Wahlenbergia stricta</i>	Bluebell	107	x	E
<i>Wahlenbergia</i> sp.	Bluebell	108	x	DE
GOODENIACEAE				
<i>Goodenia geniculata</i>	Goodenia	109	xx	DE
BRUNONIACEAE				
<i>Brunonia australis</i>	Blue Pincushion	110	u	D
STYLIDACEAE				
<i>Levenhookia dubia</i>	Levenhookia	111	x	A
<i>Stylidium graminifolium</i>	Grass Trigger-plant	112	x	DE
COMPOSITAE				
<i>Brachycome uliginosa</i>	Daisy	113	x	DE
<i>Craspedia glauca</i>	Billy Buttons	114	x	DE
<i>Helichrysum blandowskianum</i>	Woolly Everlasting	115	x	E
<i>H. obcordatum</i>	Grey E.	116	x	A
<i>H. semipapposum</i>	Clustered E.	117	x	E
<i>Ixodia achillioides</i>	Ixodia	118	xxx	DE
<i>Microseris scapigera</i>	Yam-daisy	119	x	DE
<i>Olearia ramulosa</i>	Twiggy Daisy-bush	120	x	AB
<i>Rutidosus multiflora</i>	Small Wrinklewort	121	x	A

Nature Notes from the Gold Coast

by

ALEX. N. BURNS.

The following notes are mainly entomological. Since the heavy rains of late October and early November, insect life in particular, has increased tremendously and some interesting species have been noted. Several specimens of the Praying Mantis type of Neuropteran (Mantispidae-Neuroptera) have come to light just after dusk. These pretty little insects are parasites in the egg capsules of spiders, which, at the present time are in evidence almost everywhere. Mantispid eggs are laid in groups or masses, and are each borne on a very fine stalk. The resulting larvae will perish unless they are able to find an egg capsule of a spider. If successful, the tiny larva enters the

capsule and rapidly develops into a maggot-like creature, which, when fully grown spins a cocoon within the spider's egg capsule. In due course the adult winged Mantispid emerges.

Numerous species of butterflies are now on the wing; amongst these, several species of Skippers (Fam. Hesperidae) which are fond of visiting flowers of Buddleyia and the creamy-white inflorescence of the introduced white Cotton weed Swan plant (*Asclepias fruticosa*), are being caught by spiders which lie in wait amongst the flowers. Wonderfully camouflaged, a creamy-white species is common on the Cotton-weed flowers, which are greatly attractive to skipper butterflies.

Three species fall easy prey to the spiders — the Dingy Skipper [*Toxidia peroni* (Latr.)], the White Brand Skipper [*Toxidia rietmenni rietmanni* (Semp.)], and the little Yellow Banded Dart [*Ocybadistes walkeri sothis* (Whs.)]. In the course of one day one can find a dozen or more of these in perfect condition as if resting on a flower, but dead. Two small Lycaenid butterflies, namely the Small Purple Lineblue [*Nacaduba dubiosa dubiosa* (Semp.)], and the Felder's Lineblue [*Prosotas felderi* (Murr.)] are also fond of the Cotton-weed and Buddleyia flowers, and many specimens meet the same fate as the Skippers.

Bugs (Order Hemiptera) of many species are active both as nymphs and adults in the garden and bushland. A few days ago a specimen (adult) of the large predatory Reduviid bug [*Pristhesancus papuensis* (Stal.)] was observed being itself attacked by a day flying Longicorn beetle (Cerambycidae-Coleoptera). The beetle, an orange coloured species with two black transverse elytral bands, was on the back of the bug and biting its thorax with its mandibles. Both insects were on Cotton-weed flowers; the bug was seeking refuge amongst the flowers, but the beetle held on for several minutes. Finally the beetle gave up and flew off leaving the bug apparently little the worse for the attack.

A rather worn female specimen of the large cream and black Tailed Emperor butterfly [*Polyura pyrrhus sem-*

pronius (Fab.)] was observed chasing a male Orchard Swallow Tail butterfly [*Papilio aegaeus aegaeus* (Don.)] around the garden for a minute or so. The Tailed Emperor then flew high into the bush across the road and disappeared. This "fraternising" of different species of butterflies is not uncommon with very similar types such as the Meadow Argus and Blue Spotted Painted Lady (both Nymphalidae); but is apparently rare between such dissimilar species belonging to different families.

The red Bottle Brush (*Callistemon viminalis*) is still in full flower and is attractive to many species of insects and birds. Honeyeaters of several species, and Silver-eyes are constant visitors to the trees bordering the garden; and at Currumbin where there are avenues of these trees in full flower, Rainbow Lorikeets and others add colour and interest to these flowering trees.

Three young Blue-tongued Lizards of the long tailed species have appeared in the garden; they camp under the house and enter through a ventilator grid in the brick wall at ground level. At the Sanctuary (Currumbin) this week, no less than 16 fairly large oval shaped eggs were unearthed, and have been placed in a spot where they can be observed: It will be interesting to see what they will produce. My next notes may answer this.

NORMAN WAKEFIELD MEMORIAL FUND

The Club owes a great debt to Norman Wakefield, whose recent untimely death was a sad blow to us all, and Council has decided to establish a fund to provide a fitting memorial to him. It has been suggested that this may take the form of an annual scholarship, a grant to assist in original scientific research, or perhaps a Junior Natural History Medallion, but Council would be happy to consider other proposals.

We hope that members will contribute generously to this fund, so that a really worthwhile memorial can be established. All donations should be sent to the Treasurer.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE. K.B.E., C.B., D.S.O.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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Ordinary Members	\$7.00
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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETINGS

Monday, 12 February — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for evening — “Simple background to the geology of Melbourne”:

Mr. Dan McInnes.

New Members:

Ordinary:

Mr. N. Cockhill, Lot 52, Lynnbrae Ave., Hurstbridge 3099.

Miss J. M. Kidston, 78 Justin Ave., Glenroy 3046.

Miss A. McAuley, 17 Tower Hill Dve., Ringwood 3134.

Mr. F. Noelker, 10 Kathleen St., Blackburn 3130.

Miss J. Burt, P.O. Box 22, Glen Iris 3146.

Joint:

Mr. and Mrs. R. C. Lipson, Flat 5, 22 Murrumbeena Rd., Murrumbeena 3163.

Mr. and Mrs. D. Lush, Houghton Rd., Warrandyte 3113.

Mr. T. T. Hay and Mrs. J. M. Hay, 34 Nell St., Greensborough 3088.

Country:

Mr. K. W. Black, 37 Nicol St., Yarram, Victoria 3971.

Mr. A. J. Frazer, 35 Kiwong Pl., Yowie Bay, Sydney 2228.

Miss G. N. Schlapp, c/- Gapstead P.O., Victoria 3737.

Junior:

Miss J. Tubb, 10 Clarence St., Elsternwick 3185.

Mr. J. Woinarski, House 25, Bogong, Victoria 3699.

GROUP MEETINGS

(8 p.m. at National Herbarium unless otherwise stated.)

Wednesday, 14 February — Microscopical Group meeting.

Thursday, 15 February — Day Group meeting will take place at the Fitzroy Gardens Kiosk at 11.30 a.m. A visit will be made to Parliament House at 2.15 p.m.

Thursday, 22 February — F.S.G. Meeting in Conference Room, National Museum, at 8.00 p.m. Subject: “Taxonomy and its Use” — Group Members.

Thursday, 22 February — At above venue (Taxonomy).

Monday, 5 March — Marine Biology and Entomology Group, 8 p.m. at National Museum, Library Conference Room.

Wednesday, 7 March — Geology Group meeting.

Thursday, 8 March — Botany Group meeting.

Thursday, 22 March — F.S.G. Annual General Meeting. Chairman's Address: “Land Planarians” — Leigh Winsor.

JUNIOR F.N.C. MEETINGS

Friday, 23 February — Hawthorn Town Hall at 8 p.m.

Friday, 2 March — Rechabite Hall, 281 High St., Preston, at 8 p.m.

Friday, 9 March — Montmorency and District, in Scout Hall, Petrie Park at 8 p.m.

F.N.C.V. Excursions

Sunday, 18 February — General excursion. Due to seasonal conditions the destination for this excursion will be announced at the General Meeting, but the coach will leave from Batman Avenue at 9.30 a.m.

Saturday, 10 March-Monday, 12 March — Labour Day Week-end. There will be a combined excursion to Shepparton with other clubs. A bus has been chartered and accommodation booked for the week-end. The cost for the coach and bed and breakfast at the motel will be \$24.00 per person. Further details next month.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

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Front Cover:

This photograph, taken by the Editor in 1967, is typical of the country about
The Raak, the subject of the article on p. 32 in this issue.

Early Naturalist's Writings – 2

The second of this series deals with an account of a trip by J. G. O'Donoghue to that part of Victoria generally regarded as being devoid of interest.

The writer died two and a half years after this particular excursion, but fortunately has left this and other writings of the past, which show his keen power of observation.

He joined the F.N.C.V. on November 1908, and became Hon. Secretary in June of 1914, having also held the offices of Assistant Hon. Secretary and Librarian.

He was an invaluable member on the excursion to Wilson's Promontory, the subject of the first in this series.

Rambles in Raak

During our visit to the Mallee in September, 1914, some of the incidents of which were chronicled in the *Naturalist* under the title "Wanderings on the Murray Flood-Plain" (vol. xxxii., p. 26), we heard much of a locality called Raak, situated 30 miles, or thereabouts, west of the camp we had formed on Lake Mournpoul. Remote, as it was said to be, from any human habitation, offering no great inducement to the trapper and less to the sportsman, and lying well to the north of the bridle track leading down from the Darling to Ouyen, we had reason to believe it would prove a good field for ornithological investigation. Actuated by what we had heard, and by the peculiarly favourable situation of the district, a visit thereto the following spring was decided upon, provided the season was more propitious than that then prevailing.

The long-expected break in the lengthy sequence of arid months occurred in due course, and the Mallee was visited by a generous rainfall that gave assurance of a favourable spring-tide. Arrangements for our projected excursion were consequently begun early in September, and on Tuesday morning, the 5th October, Mr. A. W. Milligan and I left the city by the 6.30 train for Nowingi, a railway station 32½ miles from Melbourne, 30 miles south of Mildura, and 10 miles east of our contemplated base of operations.

The express by which we had travelled on the previous trip had been discontinued by the Railways Commissioners for economical reasons, and we were perforce obliged to journey by a mixed train that seldom averaged 12½ miles per hour, and that tarried at many of the Mallee stations to such an extent as to permit of passengers, if they felt so disposed, making extended excursions along the surrounding thoroughfares, or into the country, as the case might be. This innovation was hailed with delight by many train-weary travellers during the daylight hours, but occasioned quite contrary feelings during the hours of darkness, when the mercury barely climbed to a higher altitude than 40 degrees, and one's nerves were frazzled by the loud and persistent bacchanalian songs of parties of uniformed roysterers.

We had not long quitted the environs of the city when we realized that the published reports respecting the bounteous season by which the State had been visited were by no means exaggerated. Wherever the eye elected to range over the more or less level basaltic plain traversed by the line, acres of rank cereal crops, or of native and exotic grasses, were to be discerned. Later on the Silurian, with its swelling contours, ushered in the eucalypts with their tender green sprays, the wild-flowers in variety and profusion, and the birds busy with the

cares pertaining to the nesting season. Still later, the brushwood-overgrown spoil-heaps of the abandoned alluvial claims showed up prominently among the dark, rugged boles and vivid green foliage of the ironbarks, *Eucalyptus sideroxylon*, and, as the train sped past and through these imperishable mementos of former men and manners, the busy and varied scenes the now silent and deserted areas had witnessed came crowding fast on one's fancy. Gone is the gold-bearing wash the palæozoic rocks had secreted, and gone, too, are the men who sought it.

At Cope Cope and Swanwater the aspect of the level Tertiary plains was pleasing in the extreme, as mile after mile of the tall, succulent, and billowing crops they nourished stretched away on either side of the railways to the circling horizon, rendering, by their vastness, the homesteads they encompassed like miniature toys. Where pasturages occurred, sleek-skinned horses and cattle and dropsical-looking sheep and lambs viewed the passing train with lazy contentedness. Introduced weeds rioted everywhere. Former cultivated fields blazed with the pale yellow rays of the Cape Dandelion, *Cryptostemma calendulaceum*, and among the crops the Hoary Cress, *Lepidium draba*, the Stonecrop, *Lithospermum arvense*, and the Wild Mustard *Sinapis arvensis*, showed prominently, and along the headlands the Musk Erodium, *Erodium moschatum*, Fumitory, *Fumaria officinalis*, and Mallow, *Malva nicaeensis*, dominated all other plants, the last-named forming, with the Small Nettle, *Urtica urens*, interspersed, immense growths, oftentimes much taller than the fencing posts.

In the railway reserve areas of yellow, blue, and white succeeded each other in varying succession, as the Pointed Everlasting, *Helichrysum apiculatum*, the Large Podolepis, *Podolepis*

acuminata, the Large Billy Buttons, *Craspedia Richea*, and the Common Buttercup, *Ranunculus lappaceus*, gave place to the Trailing Swainsona, *Swainsona procumbens*, and the Austral Bluebell, *Wahlenbergia gracilis*, and these, in turn, to the Dwarf Rice-flower, *Pimelea humilis*, and the White Sunray, *Helipterum corymbifolium*. In many places this flowering composite clothed the fields so densely as to be suggestive, at a distance, of a wide expanse of snow.

In their white or emerald setting, sheets of water of varying extent and outline glistened under the sun's rays. On these a variety of water-fowl disported, and from their margins the Straw-necked Ibis, *Carphibis spinicollis*, White Ibis, *Ibis molucca*, the Plain Plover, *Zonifer tricolor*, the Pacific Heron, *Notophox pacifica*, and the Blue Crane, *Notophox novaehollandiae*, were often disturbed by the passing train. Flocks of Pink Cockatoos, *Cacatua leadbeateri*, were noted winging their way from spot to spot, and companies of the more sober-hued Black-backed Magpie, *Gymnorhina tibicen*, and Crow, *Corvus coronoides*, enlivened the fields by their continuous change of position, induced either by a lack of amicability or quest of food.

What a different scene was presented when we traversed the same localities twelve months before! Then neither bird nor beast was to be seen. No gleam of water greeted the eye as the train progressed hour after hour through dreary, inhospitable, sun-burnt wastes, that yielded their tribute of dust to every vagrant wind. Day by day the settlers beheld their stock sink and die from thirst and starvation. Some gave up the struggle and quitted the Mallee for ever; others, by reason of the possession of more determination, or possibly a lack of initiative, stayed on, hoping for the break in the drought. It came in due course,

and they now view, with mingled feelings the waving, luscious grass with which a beneficent Providence has so lavishly carpeted their holdings after depriving them of the animals and the means to make use of its tardy bounty.

At 4.20 on Wednesday morning the train pulled up in the Mallee, and we were apprised that we had arrived at Nowingi. Descending from our carriage in rather a gingerly fashion, for the drop was fully five feet, we were welcomed by Mr. F. T. Stone, from Mildura, and Johnny Richmond—to whom reference was made in our previous paper—from the Kulkyne Station.

The morning was bitterly cold, the ground in places being white with hoar frost, and no second invitation was needed from Johnny to repair to his gunyah, some few hundred yards distant, and sample a billy of tea. The camp was picturesquely situated among the Giant Mallee, *Eucalyptus incrassata*, and False Spinifex, *Triodia irritans*, and as we reclined in various negligent attitudes around the genial fire waiting for the billy lid to chatter, we could discern, within the radius of light cast by the leaping flames, numerous blooms of the Satin and Golden Everlastings, *Helichrysum leucopsidium* and *Helichrysum bracteatum*, and that the ground on which we rested was thickly matted with the Austral Stonecrop, *Tillæa Siberiana*, the Small-leaved Poranthera, *Poranthera microphylla*, the Bent Goodenia, *Goodenia geniculata*, the Pink Purslane, *Calandrinia calyptata*, and tufts of the Grass Cushion, *Isætopsis graminifolia*.

Before five o'clock it was possible to see our surroundings. Nowingi, we found, consisted of two repairers' residences and a small portable hut for the ganger. There was no platform, but three rusty iron tanks, a lamp, and a red flag served to mark the stopping-

place. The view was limited, being bound on all sides by a seeming impenetrable wall of sombre green. At 6.30, to the accompaniment of the calls of the Singing Honeyeater, *Ptilotis sonora*, and the ventriloquial notes of the Crested Oreoica, *Oreoica cristata*, we broke camp, Johnny driving the springcart laden with our goods and personal effects, we following on foot, the course being due west.

The journey had not long begun when a call from our guide, and his extended arm, directed at some object among the stunted eucalypts in front, claimed our attention. Hurrying forward, we discerned a pair of Plain Plover, with two young ones, running away as fast as possible. On our near approach the young ones secreted themselves on the sand, their immature covering harmonizing perfectly with their surroundings, and the old birds flew off; but, on finding that we had located their brood, they returned, and, alighting at our feet, simulated injury, that we might essay to capture them, and in the effort withdraw a distance sufficiently remote to enable their young to steal away to a more favourable situation. Ignoring these tactics, we picked up the chicks, to the accompaniment of many peeping protests, and started them off towards their distressed parents, who greeted them with manifestations of delight, and lost no time in conducting them to a place of safety.

Shortly after leaving Nowingi the mallee and spinifex, in which we had sojourned for so brief a period, disappeared, and was succeeded by open, well-grassed country on which the Sandalwood, *Myoporum platycarpum*, the Needle Hakea, *Hakea leucoptera*, Leafless Ballart, *Exocarpus aphylla*, Berrigan, *Heterodendron oleæfolium*, Murray Pine, *Callitris robusta*, the Umbrella Acacia, *Acacia Osswaldi*, and the Furze Acacia, *Acacia colleti-*

oides, flourished. These, in turn, were succeeded by the Belar *Casuarina lepidophloia*, and the Weeping Pittosporum *Pittosporum phillyraeoides*, and a variety of Chenopodiaceous plants, as the first of the many score of dry lake-beds we subsequently encountered was met with.

The number and extent of these so-called "salt-pans" or "lakes" are the most striking physical feature of Raak. They vary greatly in size, some being of comparatively small dimensions, and others of vast area. Their longer axis is invariably north and south, and they undoubtedly owe their origin to long and continuous wind erosion on the friable arenaceous soil. The occasional isolated residuals, of no mean height and extent, that occur within them tend to support this view. Composed of material of more than average resistance, these residuals have successfully withstood the æolian denudation that proved so destructive to the areas by which they had been at one time surrounded. The "salt-pans" seldom retain water for any lengthy period, and are encircled by sand-dunes, which attain a greater elevation on the eastern aspect than elsewhere. On two occasions during the course of our wanderings we beheld what appeared to be the initial process in the formation of a "pan"—sand-blows of great extent. In these we found several small and slightly scattered piles of weathered ochre—possibly originally a Venetian red, discoloured by fire—that occurs in the locality, the pieces being about the size of a tennis ball. These, we were informed, were "cooking stones" used by the blacks in one of the several processes they adopted in preparing their food. On the other hand, the ochre may have been used by the Aborigines in the adornment of their persons in those weird ceremonies they so dearly loved and constantly practised, and lost with the

containing "dilly bag" by some careless gin.

As all the "pans" noted by us bore the indubitable appearance of age, it would seem that the agent by which they were formed is not so potent now as formerly, or, if so, is controlled by some factor that holds its power in check. Undoubtedly that factor is the protective influence now exerted on the friable soil by the pines, casuarinas, eucalypts, acacias, etc., the Chenopodiaceous plants, grasses, and composites, which, possibly, were negligible elements, if they existed at all, during the formation of the depressions. The floors of most of the "pans" are perfectly level, but prove tiresome walking, owing to their yielding surface, which gives like velvet pile beneath one's feet. The whole is of a pinkish tint, glints like hoar frost under the sun's rays, and occasions many deceptive mirages. Sinking to the depth of six inches below the surface, one comes upon a deposit of varying thickness of arrow-shaped crystals of sulphate of lime, or gypsum. Beneath this moist, tenacious, ferruginous sand is met with, but to what depth it continues, or whether other bands of crystals exist, the means at our command did not permit of determining. Chenopodiaceous plants of many varieties margin the "pans", and overgrow some of the more extensive. The Sea Heath, *Frankenia pauciflora*, the Dillon-bush, *Nitraria Schoberi*, and the Angular Pigface, *Mesembryanthemum equilaterale*, are common, and the Murrnong Yam, *Microseris Forsteri*, abounds in thousands. On such areas the Tricoloured and Orange-fronted Chats, *Ephthianura tricolor* and *Ephthianura auriifrons*, and the White-winged and Blue-breasted Wren-Warblers, *Malurus leucopertus* and *Malurus assimilis*, find a congenial home.

Pushing on after our guide, who,

with less interest in the surrounding country than ourselves, left us hopelessly in the rear within the first half-hour, we crossed, in succession, lake-beds margined or overgrown with the Sea Glasswort, *Salicornia australis*, and the Dwarf Saltbush, *Atriplex halimoides*; open glades whereon the Fibrous Spear-grass, *Stipa semibarbata*, with the Austral Bluebell intermingled, grew almost waist-high; and expanses of loose, dry sand, seemingly incapable of affording nutriment to any form of plant life, yet on which occurred many luxuriant specimens of the Flannel Cudweed, *Gnaphalodes uliginosum*, the Narrow-leaved Podotrochea, *Podotrochea angustifolia*, the Slender Podolepis, *Podolepis Siemsenii*, and the Stiff Cup-flower, *Angianthus strictus*.

Now the track winds among the Tall Mallee, *Eucalyptus incrassata*, wherein bewildered companies of White-winged Choughs, *Corcorax melanorhamphus*, shelter and noisily herald our approach; over some flat redolent of the perfume from the Needle Hakea, *Hakea leucoptera*; up a Berrigan (*Heterodendron oleaefolium*) clad hill, and anon winding through the serried ranks of the symmetrical pines. A wire fence that stretches across the path, and the ruins of an old hut, proclaim the fact that our destination is near at hand. These are, however, not needed to demonstrate the neighbourhood of a human habitation. The weeds, the usual concomitants of settlement, are sufficient evidence. Among the Tall Thickheads, *Myriocephalus Stuartii*, which so thickly clothe the slopes and open country as to make walking a task rather than a pleasure, the Large Quaking-grass, *Briza maxima*, the Soft Brome, *Bromus mollis*, and the Canary-grass, *Phalaris canariensis*, nod heavily-weighted panicles, and the Rough Poppy, *Papaver hybridum*,

flaunts its bright red petals. The Common Vetch, *Vicia sativa*, the Wild Melon, *Cucumis myriocarpus*, the French Catch-fly, *Silene gallica*, and many others abound, and evidence is not lacking to prove the instrumentality of the recent drought in contributing to the wide distribution of the Ice Plant, *Mesembryanthemum crystallinum*. In normal seasons stock leave the plant untouched, but during the recent drought they were compelled to consume it to assuage their hunger, and thus ensure the dispersal of its seeds over grazing areas hitherto free from this troublesome annual.

Ascending a slight eminence, an extensive expanse of country unfolds to our view. To the north and north-west glimpses of distant lake-beds are to be had, and beyond them a dense background of pines and Belar. To the west, and not very remote, a medley of pines, Belar, Berrigan, and Needle Hakea restrict the view; whilst to the south and south-west an unbroken succession of dry lake-beds of vast dimensions extend to the distant horizon. The eminence slopes gradually to the plain country to the west, and the lake-beds to the north, and ends somewhat abruptly to the south, the whole being thickly clothed with the Tall Thickheads. Nestling among a group of pines a few hundred yards distant was our Mecca — a hut. Hastening towards it, we find it to be a one-roomed structure, roofed with galvanised iron and built of pine logs. The next few hours were busy ones. Provisions had to be unpacked, tent and sleeping bunks to be erected, personal belongings arranged to satisfaction, and the wants of the inner man satisfied.

Shortly after midday we set out on the first one of the many daily tours of investigation undertaken during our sojourn at Raak. Bearing due north over a large lake-bed, we as-

cended a slight elevation on which many trees of Sandalwood, in profuse bloom, and the Sweet Quandong, *Fusanus acuminatus*, heavily laden with bright red pericarps, grew, and entered a dense forest of Belar, *Casuarina lepidophloia*, and Buloke, *Casuarina Luehmanni*, the former predominating. This distinctive class of vegetation, as we afterwards ascertained, extended in an easterly and westerly direction in the form of a crescent for several miles, and was of variable width, half a mile being about its maximum. The ground beneath the trees was littered with fallen cones and filaments, and did not appear, even in an exceptionally favourable season, to contribute to more than a meagre growth of plant life. Of the few met with, the Shrubby Twinleaf, *Zygophyllum fruticulosum*, the Four-leaved Allseed, *Polycarpum tetraphyllum*, and the New Zealand Spinach, *Tetragona implexicoma*, seemed to thrive best in such uncongenial surroundings.

As we wandered through the cool and shadowed vistas of Buloke and Belar, that rang incessantly with the loud, pleasing calls of Gilbert's Thick-head, *Pachycephala gilberti*, we saw, among other birds, the Black-capped Tree-runner, *Sittella pileata*, the Brown Tree-creeper, *Climacteris scandens*, and the Bronze-wing Pigeon, *Phaps chalcoptera*, the last-named being invariably flushed from beneath, or in the vicinity of, a growth of the Furze Acacia.

Beyond the northern extension of the casuarinas a more arenaceous formation occurred, on which flourished, in more or less abundance, the Murray Pine, the Leafless Ballart, the Furze Acacia, the Tautoon, *Leptospermum flavescens*, and the Small-leaved Wax-flower, *Eriostemon difformis*. Some fine specimens of the Australian bugle, *Ajuga australis*, the Fleshy Senecio,

Senecio Gregorii, the Immortelle, *Waitzia acuminata*, and Silver Tails, *Trichinium obovatum*, were noted growing among the spinifex and the eucalyptus, which comprised the Oil Mallee, *Eucalyptus oleosa*, the Tall Mallee, *Eucalyptus incrassata*, the variety *angulosa*, and a type intermediate between it and the normal form. The Golden Everlasting, and the less sturdy Satin Everlasting, were numerous. The former seemed to favour the open situations, whilst the latter was invariably found growing in, or close beside, a tuft of spinifex. In this respect it was not the only growth that claimed the protection of, or derived its sustenance from, the spinifex, for in many spots the nebulous-like panicles of the Feather Spear-grass, *Stipa elegantissima*, rising like wraiths from out of the centre of innumerable masses of dry and pungent leaves, lent quite a charm to the scene.

Continuing westerly for some little time through vegetation such as has been described, we bore south, and, after traversing the belt of Belar and Buloke previously mentioned, emerged on to open, park-like country. Here, among the flowering Sandalwood and Needle Hakea, we noted the Sordid and the Masked Wood-Swallows, *Artamus sordidus* and *Artamus personatus*, and the Spiny-cheeked Honey-eater, *Acanthochaera rufigularis*, and found the nest and eggs of the Black-eared Miner, owing to the bird's pertinacious attacks on a Bronze-Cuckoo, *Chalcococcyx plagosus*.

A direct traverse was now made for the hut through the Tall Thickheads, the Crested Goosefoot, *Chenopodium cristatum*, and the Variable Senecio, *Senecia lautus*. As we reclined in the shade of the pines after our journey, and listened to the notes of the Black-and-White Fantail, *Rhipidura tricolor*,

and the White-shouldered Caterpillar-eater, *Lalage tricolor*, that were borne to our ears on the gentle breeze, it seemed hard to realise that within comparatively recent times the country which we had just traversed without beholding a wild or a domestic animal was enlivened by thousands of emus and kangaroos, numbers of dusky aborigines, and vast herds of wild horses and cattle. Raak, according to documentary evidence, was first traversed by a white man in 1848, and stocked a year or two later. In the '70's it was the stronghold of innumerable wild horses and cattle, which rendered it difficult for the stationholders on the areas fronting the Murray to keep stock unless great and unceasing vigilance was exercised. Issuing from their native fastnesses during the hours of darkness, these warrigals descended in droves on the home paddocks and inveigled the station stock away to a life of liberty in the remote recesses of the Mallee. So numerous did they become that, in the vicinity of the water-holes and puddles to which they resorted after nightfall, it is said, one could not hold converse with a companion unless by shouting, by reason of the angry and incessant bellowing of the bulls. To reduce their numbers a drive was determined upon, and resulted in 500 head of cattle being yarded and travelled to the Melbourne market. This procedure, however, was not persisted in, owing to the warrigals

realizing little more per head in the city than it cost to yard them on their native wild. Shooting was next resorted to, and, with Aborigines to flay the victims of his skill, one individual is credited with slaying nearly 1,800 head in a very short period. The number slain in any one day was regulated by the expertness of the flayers, and the greatest number shot in any one week, it is said, was 80, for which a sum of 12s. 6d. per head was paid the hunter, he surrendering to the owner of the run the cured skins. The method invariably adopted in slaying the cattle was to ride hard after the beast selected, and to place the muzzle of a shortened shot-gun, loaded with a heavy spherical ball, close behind its shoulder and fire, the animal in nearly every instance being killed outright by the discharge. The bleached and massive bones of these unfortunates are still to be met with, and, when one comes upon them in the midst of the Mallee, the mind at once reverts to the last headlong rush of the terror-stricken beast through the eucalyptus thickets, closely followed by the wildly-excited horse and its reckless and determined rider, to the loud report that knelled its doom, to the dusky beings who subsequently busied themselves about its body, and to the dingoes that, later on, fought over and gorged themselves upon the reeking flesh.

(To be continued.)

Set of "Victorian Naturalists"

Following the recent offer of a set of "Naturalists", requests were received from the Libraries of C.S.I.R.O. (Division of Wildlife Research), La Trobe University, Native Plants Preservation Society, and the Gould League. Would any member who has a set of "Naturalists" of some duration which they would be prepared to give to one of these Libraries, please contact the Secretary.

Nature Notes from the Gold Coast

by

ALEX. N. BURNS

Since the heavy rains of later October and early November, although the weather since has been dry and hot, insects have been very plentiful. In the butterfly world, specimens of the Capaneus Swallow-tail [*Papilio fuscus capaneus* (West)] have been observed in the garden. Two females in good condition were captured, and their presence caused a search to be made on young shoots of the Grapefruit and Cumquat trees for presence of eggs. A few were found and taken for breeding though only two larvae reached maturity and pupated, with one green pupa, and the other fawn-grey. These should produce adult butterflies in the next week or ten days.

In the range of this fine butterfly (Cape York to Ballina, N.S.W.) it is usually a mid or late summer insect, and is much rarer south of Maryborough than to the north.

Several specimens of the small Dark Orange Dart Skipper [*Ocybadistes ardea heterobathra* (Low)] have been seen at flowers of Lobelia in the garden. This is another species which ranges from Cape York to Burleigh Heads; again much rarer in the south than in the north. Until fairly recently the southernmost range limit was Noosa Heads, 116 miles north of Brisbane; when the writer caught specimens in the Burleigh National Park, thus increasing its southern range by 170 miles.

Particularly active throughout the month have been the "White" spiders frequenting flowers of the White Cotton weed (*Asclepias fruticosa*) and racemes of the garden purple Buddleya. The following list of "captured"

insects by these spiders is most interesting, especially as some of the spiders' victims were very much larger than their captors. The following specimens of Skipper butterflies were captured whilst visiting flowers amongst which the spiders were lurking. The Greenish Darter [*Telicota ancilla ancilla* (H.Sch.)] three specimens (this is a fairly large species); the Large Dingy Skipper [*Toxidia peroni* (Latr.)] five specimens (this too is a medium sized skipper); the White Brand Skipper [*Toxidia rietmenni rietmanni* (Semp.)] at least a dozen specimens (this is a slightly smaller species); the Green Awl [*Hasora discolor mastusia* (Fruhs.)] five specimens (this is a large and strong flying species which is on the wing mostly early and again late in the day).

Even more interesting is the capture of large and strong swallow-tail butterflies; with no less than three specimens of the Pale Green Triangle [*Graphium eurypylus lycaon* (West)] and one of the Blue Triangle [*Graphium sarpedon choredon* (Feld)]. These are strong flying butterflies, which, when visiting flowers, keep their wings in constant motion, and spending a few seconds only at each flower. The lurking spider seizes a leg and rapidly spins a few threads to assist in holding its prey; then in a matter of seconds the spider pierces the ventral portion of the butterfly's thorax with its mandibles rendering it immobile almost instantly. The spider then sets to work to feed on the body juices of its prey.

For a long time after the spider has "drunk" its fill, the dead butter-

fly adheres to the flower, being supported by a few threads entangling its legs. Another fairly large and strong-flying butterfly captured by these spiders is the Common Albatross [*Appias paulina ega* (Boisd)]. One male and one female have been observed and caught at Buddleyia flowers.

Moths, too, do not escape from the spiders which are apparently just as active at night as during the day time. Several species of Noctuids including the Bogong Moth [*Agrotis infusa* (Boisd)] have been noted; and also one large Geometrid [*Terpna* sp.] as well as numerous species of small moths representing several families.

Perhaps more interesting still was the capture of a large black and orange-red male Psammocharid wasp which was being held by the spider when first observed. Other miscellaneous insects noted were, one large Crane fly (*Tipulidae-Diptera*); two species of March flies, one very large (*Tabanidae-Diptera*) and several parasitic flies (*Tachinidae-Diptera*).

The last interesting observation was a fairly large female Orb Web Spin-

ning Spider! One wonders if these white predators might even be cannibalistic.

One very interesting thing comes from these observations; both flowers of the Cotton weed and Buddleyia are very frequently visited by several species of butterflies belonging to the Sub-family Danainae of the Nymphalidae, and to date not one example has been seen to be attacked. The butterflies noted were The Common Crow [*Euploea core corinna* (Macl.)]; the Eastern Brown Crow [*Euploea tulliolus tulliolus* (Fab.)]; the Lesser Wanderer [*Danaus chrysippus petilia* (Stoll.)]; and the Blue Tiger [*Danaus namata namata* (Macl.)]. These butterflies remain for a long time at flowers and are apparently not attacked. Is it because they are distasteful to birds that they are also distasteful to spiders? The larvae of these four species of butterfly feed on plants which exude a bitter milky sap when broken. It is this type of food that is thought to be the cause of rendering them immune to bird attack.

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Nature as Quarryman

by EDMUND D. GILL*

Erosion is a universal process of the land masses. Tectonic forces uplift the land and erosive processes pull it down. Where these processes are dramatic, we say the scenery is good. However, there is still a great deal to be learnt about how erosion takes place, and quantitative studies are only in their infancy. At present we do not even know for sure how a shore platform is made. In observing erosion along the coast and in the valleys I have been impressed with Nature as a Quarryman.

Australia is remarkable for its great length of lime-sand (calcarenite) coasts, as for example at Point Nepean and at Warrnambool in Western Victoria. Constant wetting and drying results in the lithification of this rock to aeolianite, which the sea erodes slowly. However, such a coast at times erodes quickly, and I have noticed through observing the detail of erosion at Thunder Point, Warrnambool, for over 30 years that the rapid progress is due commonly to the sea quarrying along fossil soils. Big blocks of rock then collapse on to the shore platform, where they are more readily broken up by grinding and other movements in the wave zone.

An example from the valleys of natural quarrying is the way weathering and erosion penetrate along joint planes to quarry out masses of rock, thus considerably speeding up the reduction of the terrain. Conversely, the resistance of massive rocks to erosion is very impressive. Yosemite National Park in California has walls of granite

2,000 to 5,000 feet high which have stood since the Ice Age because it is massive and joints are rare. There are no chinks in its armour, so to speak. If the granite had been criss-crossed with joint planes, those walls would long ago have collapsed into rubble slopes. The scenic quality of Yosemite is a function of the massive nature of its bedrock. Similarly in Victoria where there is a solid basalt flow (as at Geelong) or a massive sandstone band (as in the Grampians), it will control the development of the terrain and the rate of erosion. Thus the hardest of rocks can be fairly readily reduced if there are weaknesses in structure, such as joint planes, so placed that Nature can work along them as quarryman. It is a matter of "divide to conquer".

This process operates in small scale as well as in large. At some places (like the Lower Devonian siltstones at Lilydale) there are rocks that readily decrepitate, breaking into tiny cubes. In such areas the soil is full of these cubes, and the sides of the valleys are smooth and of relatively low angle. Cuttings in roads soon break down, and the angle of the cutting reduced, with much work to keep the gutters clear. It would be reasonable to cut batters in the first place at the resting angle of the breakdown material.

Most of the dramatic elements in our landscape are due to massive rocks, for they are the ones (and not necessarily the hard rocks) that defy Nature the Quarryman.

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An Unusual Food Item in the Diet of Red Foxes (*Vulpes vulpes* L.)

by BRIAN J. COMAN*, P. L. STEPHENS*, R. W. STARK†

Studies on the diet of the fox (*Vulpes vulpes* L.) in Australia indicate that this animal is an opportunist predator and scavenger, with a wide dietary range (Mackintosh, C.S.I.R.O. Wildl. Res., 8 : 1-20, 1963 and Martensz, C.S.I.R.O. Wildl. Res., 16 : 73-75, 1971). The opportunistic nature of the fox's feeding was well demonstrated in a recent investigation of cabbage losses at a commercial vegetable farm near Frankston, Victoria.

During the latter part of June 1972, a vegetable grower reported severe and unexplained losses amongst part of his cabbage crop. An examination revealed that the damage was being caused by foxes eating parts of mature cabbages. Numerous fox tracks and scats containing poorly digested cabbage fragments were found between the wind-rows.

Although five cabbage varieties were present on the property, only one was eaten by the foxes (Greengold hybrid). Damage was confined to the hearts of mature plants. Large quantities of shredded leaves at the base of plants suggested that feeding was very selective, with only a small part of each cabbage actually ingested. Total losses exceeded 1,000 plants. In two patches of Green Gold Hybrid examined (approx. 5,500 plants each), 852 plants were damaged or destroyed by foxes. This represented a loss of 7.7% over both patches.

Night observation, with the aid of a spotlight, revealed heavy fox activity in and around the cabbage lands. A total of 14 fox sightings was recorded,

at least 9 of these being different individuals. Three foxes were shot amongst the cabbages and a further two within 300 metres of the lands. An analysis of stomach contents for these animals was carried out and the results are shown in the Table.

Although only two of the stomachs contained cabbage material, it should be pointed out that the other foxes were killed early in the night and might have had little opportunity to feed from the cabbages. A freshly ploughed section of the property contained remnants of an earlier carrot crop, and this would undoubtedly explain the origin of carrot material found in one stomach. On the night prior to the shooting of these foxes a large goose was killed (presumably by predators) adjacent to the vegetable paddock. A comparison of feathers from the carcass and those found in one fox stomach suggested that this fox was responsible for the death of the goose. No other predators were known to be in the area.

In addition to the stomach analyses, a number of scats from the immediate vicinity of the cabbage lands were collected and examined. The majority of these were composed of poorly digested cabbage material. Other items were the fur of a rabbit (*Oryctolagus cuniculus*), insect remains (*Coleoptera*, *Orthoptera*) and grass.

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It seems unlikely that foxes were eating cabbages because of a severe shortage of more conventional food items. Rabbits were reasonably common in the area, and some hares (*Lepus europeaus*) were seen. A pig

carcass, situated close to the cabbage lands, showed no signs of mutilation or feeding by foxes. According to the owner of the property, mice (*Mus musculus*) were prevalent in the area.

Table

Food Items from the Stomachs of 5 Foxes (*Vulpes vulpes* L.)
Killed Near Frankston, Victoria.

<i>Food Items</i>	<i>Number of Occurrences</i>
Grass	3
Cabbage	2
Larvae (<i>Lepidoptera</i>)	2
Mouse (<i>Mus musculus</i>)	2
Carrot	1
Goose feathers	1

Field Naturalists Club of Victoria

General Meeting — 11 December

The President, Mr. Tom Sault, took the chair at the final meeting for the year with a good attendance of members and friends.

The death of Mrs. Samuel was announced and a moments silence observed. Mr. Cameron spoke briefly about her life and interests; they both having been one-time residents of King Island.

The evening's programme was presented by Mr. Bill Davis of the Save Westernport Coalition, who showed two films, "The Shame of Westernport" which he made himself, and "Warning Warning", telling the story of pollution in San Francisco Bay.

The full list of correspondence was on display with copies of some letters. The Secretary again urged members to look through these and said that he would welcome enquiries from members wishing to read any letters not on display. He mentioned in particular "Streams of the Dandenongs", received from the Environment Protection Authority, which is a draft policy for the area, and in-

cludes proposals affecting the Edithvale Swamp.

The President announced the resignation from Council of Mr. David Reeves and the appointment of Mr. Damien Kelly, who also became Assistant Treasurer. Mr. Sault said he hoped that all Council vacancies would be filled at the Annual Meeting in March.

Mr. Ros Garnet reminded members of the need to pursue the Lake Pedder issue since the election of a new Government, and urged members to write to the Prime Minister and to their own members in the House of Representatives.

Mrs. Z. Lee raised the matter of reports of damage to Mallee sandhill areas by motor-bike "scramble races". It was agreed that Council could discuss the matter. The Secretary said that Council welcomed the raising of matters of concern, but impressed on members the necessity for supplying full and accurate information. It was impossible, in most cases, for Council to make on-the-spot investigations, but if the Club's protests were to be taken seriously by the autho-

rities concerned they must be backed by reliable facts, for which Council depended largely on members.

Among the exhibits on display was a fruiting specimen of the fungus, *Polyporus mylittae*, "Blackfellows' Bread".

General Meeting — 8 January

The President, Mr. Tom Sault, took the chair at the January meeting with a smaller than usual attendance, due no doubt to the holiday season.

As is usual in January the evening's entertainment was a Member's Night organised by Mr. Ian Cameron. The five speakers all used slides to illustrate their talks.

Mr. Alan Morrison spoke on "Insects and Plants from various parts of Australia"; Miss Carolan — "Summer in Central Australia" — dealt with station life in the outback. Mrs. Bennett showed slides which had been taken on Club excursions. Mr. Griffiths discussed the significance of an Aboriginal relic in the bed of Lake Moore, now dry, on Mt. Gibson Station in Western Australia. Mr. Peter Kelly showed the life history of a species of leaf-eating beetle, and Miss Wollard discussed some aspects of conservation with particular reference to roadside plants and landscape.

Included in correspondence was a letter from a visiting botanist, Mr. R. J. Chinnock, who is working in the South Australian Herbarium on the genera *Hypolepis* and *Tmesipteris*. Mr. Chinnock is anxious to contact any amateur naturalists who have knowledge of these plants. Further details may be obtained from the Club Secretary.

Mr. Riordan announced that a successful Christmas barbecue held at his home had resulted in a profit of \$16 going to the Wakefield Memorial Fund.

Mr. Sault reported briefly on a combined camp held by several Club Groups at Licola over the holiday period and several exhibits from the area were on display.

The exhibit table was well stocked and additional interest was provided by the brief remarks of most exhibitors. Collections from the Licola camp included a wasp's nest and geological specimens from Wellington and Dolodrook rivers and from near Bennison Plain.

Mr. Ken Strong showed a series of photographs taken through a microscope using a cheap old-style box camera. One Club microscope was in use and there was also a display of garden grown

native plants; a pressed specimen of the Queensland stinging tree, *Laporta moroides*; a tray of shells showing various blister formations and some specimens of ochreous rocks from Phillip Island.

Botany Group — 14 December

Mr. Rex Filson, lichenologist at Melbourne's National Herbarium, and author of "Lichens and Mosses of MacRobertson Land", gave a most interesting talk on his overseas visits to herbaria in a number of countries (as a Churchill Scholarship winner). His aims were to examine type specimens of Australian species, to go on field trips to collect named species of genera represented in Australia, and to make personal contact with the leading lichenologists in those countries to facilitate later mutual correspondence in this specialist field of botany.

Rex and his wife Sue (who as a keen bushwalker took active part in the field trips) were able to stay close to the herbaria or in the homes of lichenologists in Austria, Germany, Switzerland, Sweden, Norway, United States and Japan. Colour slides were shown of herbarium buildings, botanical gardens features, special displays of flora, and lichens in a number of habitats (including ancient tombstones!) in such places as Munich, Geneva, Uppsala (we were shown the original cottage and garden of Carl von Linne, usually known as Linnaeus, where the plants are in most cases lineal descendants of those he used in his naming of species), Oslo and Bergen. An altitudinal rail journey across Norway provided many picturesque slides, many successful ones being taken from the moving carriage. They arrived in London in June (and Kew Gardens).

The speaker has promised to give a talk on "A Botanical Meal in Japan" at the Botany Group meeting in July next year — a unique experience, it seems! The Japanese and American sections of his trip were not dealt with at the meeting. A varied array of questions was competently answered by Mr. Filson.

Election of office-bearers for the ensuing year resulted in Mr. Ian Cameron becoming the new chairman, and Mrs. Margaret Corrick the new secretary, in succession to Mr. Karl Kleinecke, and Mr. Jim Baines, respectively, both of whom, after a two-year tenure of office, did not seek re-selection.

The meeting concluded with supper and conversazione.

Hawthorn Junior Field Naturalist Club

ANNUAL REPORT, 1972

Key Office-bearers, 1 January 1973

President — Michael Coulthard.

Treasurer — Wendy Clark.

Excursion Secretary — Caroline Durré.

Secretary — Robin Sandell.

Editor — Alan Burns.

Programme Secretary — Noel Disken.

Administration of Club activities faced some difficulty in 1972, with three of the key office-bearers attempting their Higher School Certificate Exams during the year. Despite this, management ran smoothly, and membership increased slightly to about 160.

Early in September, the stalwart of Club organisation over the past ten years, Barry Cooper, left Australia to further his tertiary education at Ohio University, U.S.A. He was a fine and enthusiastic worker in almost all areas

of the Club, having held the offices of Excursion Secretary, Editor and Club Recorder. Barry has been an honorary member since 1970.

Two resignations earlier in the year were those of Carl Meyer, as Treasurer, and Joan Hindle as Secretary. Wendy Clark took over the position of Treasurer and, with the aid of Michael Coulthard, a thorough revision of the financial system of the Club was made.

Rather than re-appoint a Club Recorder to replace Barry Cooper, the duties of the Secretary were extended and an Assistant Secretary appointed. The two positions are now held by Robin Sandell and David Saunders, respectively.

Meetings for 1972

28 January — Members' Night.

25 February — "Phalanyers and Phascogales", by John Seebeek.

24 March — "The Snowy River District", by Mr. Norman Wakefield.

28 April — "Galls", by Messrs. P. Kelly and K. Strong.

30 June — "Lyrebirds", by Messrs. Ralph Kenyon and Tim Hunt.

26 May — "Volcanoes", by Mr. Tom Sault.

28 July — "Parasites", by Mr. Leigh Winsor.

25 August — Celebration of 29th Birthday.

29 September — "Geology of the Melbourne Area", by Mr. Gary Wallis.

27 October — "Water Birds", by Miss Joan Forster.

24 November — "Nature in the Dry Country", by Mr. Jack Hyett.

Excursions:

Caroline Durré continued office as Excursion Secretary. Day trips held during the year:

12 February — Point Lonsdale — Marine Life.

27 February — Cape Schank — Walking Trip.

30 April — Botanic Gardens — Pondlife.

2 July — Sherbrooke Forest — Lyrebirds.

20 August — Lilydale Area — Fossils.

17 September — You Yangs — General.

28 October — Royal Botanic Gardens — Water Birds.

Easter Camp:

The 1972 camp was held in the Suggan Buggan area of East Gippsland. A record number of 96 people attended, both in the hired bus and in private cars. Day trips from the campsite included visits to the spectacular Little River Gorge, the Snowy River Valley at the N.S.W. border, and Ballantyne's Hills.

A special meeting was held on 17 June, for the display of slides and photographs taken on the camp. This was attended by 53 members and friends.

Publications

"The Junior Naturalist" has completed Vol. 8. Articles of special interest included a Reptile survey conducted by three members in the Hattah Lakes National Park and a report on the Easter Camp over two issues. With the Editor, Alan Burns, heavily committed to school work, and the Assistant Editor having to retire early in the year, some issues were reduced in size. It is hoped that Alan will have an assistant in 1973.

One new club publication printed this year was "Pondlife", by Alan Burns.

Native Flower and Nature Show

The five exhibits organised by the Club at the S.G.A.P. Show in September were Spiders, Marine Life, Tektites, Fossils of Koonwarra and Reptiles.

Prior to the display, a three-day camp to the Cumberland River, near Lorne, was held, where collections were made for the Spider and Marine exhibits.

Subscriptions

With spiralling costs in the production of the magazine, there is a likelihood of an increase in the membership fee in 1973. The last re-appraisal of fees was in 1967.

Present rates are: Junior Membership, 80 cents per annum; Adult Membership, \$1.20 per annum.

Constitution

Early in 1972, a sub-committee was formed to make some minor alterations to the Club's four-year-old constitution, and to investigate the possibility of altering the present system of electing council members. Most of the alterations were accepted by Council and subsequently at a General Meeting of the Club; but those changes relating to the admittance of Members to Council did not meet with agreement.

Field Survey Group, F.N.C.V. Survey Camps, 1973

- 27, 28, 29 January — Mt. Erica.
- 10, 11 February — Boola Boola Forest, Traralgon.
- 10, 11, 12 March — Avoca.
- 14, 15 April — Korumburra District (North).
- 20-25 April (Easter) — Sunset Country.
- 12, 13 May — Bellarine Peninsula.
- 9, 10, 11 June — S.E. Gippsland.
- 14, 15 July — Acheron Way, Donna Buang.
- 11, 12 August — Strathbogie Ranges.
- 8, 9 September — Maryborough.
- 13, 14 October — Korumburra District (South).
- 10, 11 November — Upper Yarra Area.
- 8, 9 December — Blackwood-Trentham.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.



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2100...
2200...**

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centuries ahead**

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FORESTS COMMISSION, VICTORIA



Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

Key Office-Bearers, 1972-1973.

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Mr. T. SAULT

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Geology: Mr. T. SAULT.

Mammal Survey: Mr. D. KELLY, 107 St. Elmo Road, Ivanhoe, Vic. 3079 (49 4583).

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Rates of Subscriptions for 1973.

Ordinary Members	\$7.00
Country Members	\$5.00
Joint Members	\$2.00
Junior Members (under 18 years)	\$2.00
Junior Members receiving <i>Vict. Nat.</i>	\$4.00
Subscribers to <i>Vict. Nat.</i> (Aust. only)	\$5.00
Overseas Subscribers	\$6.00
Affiliated Societies	\$7.00
Supporting Members	\$10.00
Life Membership (reducing after 20 years)	\$140.00

The cost of individual copies of the *Vict. Nat.* will be 45 cents (52 cents — overseas requests).

Full-time Students between 18 and 21 years pay at Junior Member rates.

All subscriptions should be made payable to the Field Naturalists Club of Victoria, and posted to the Subscription Secretary.



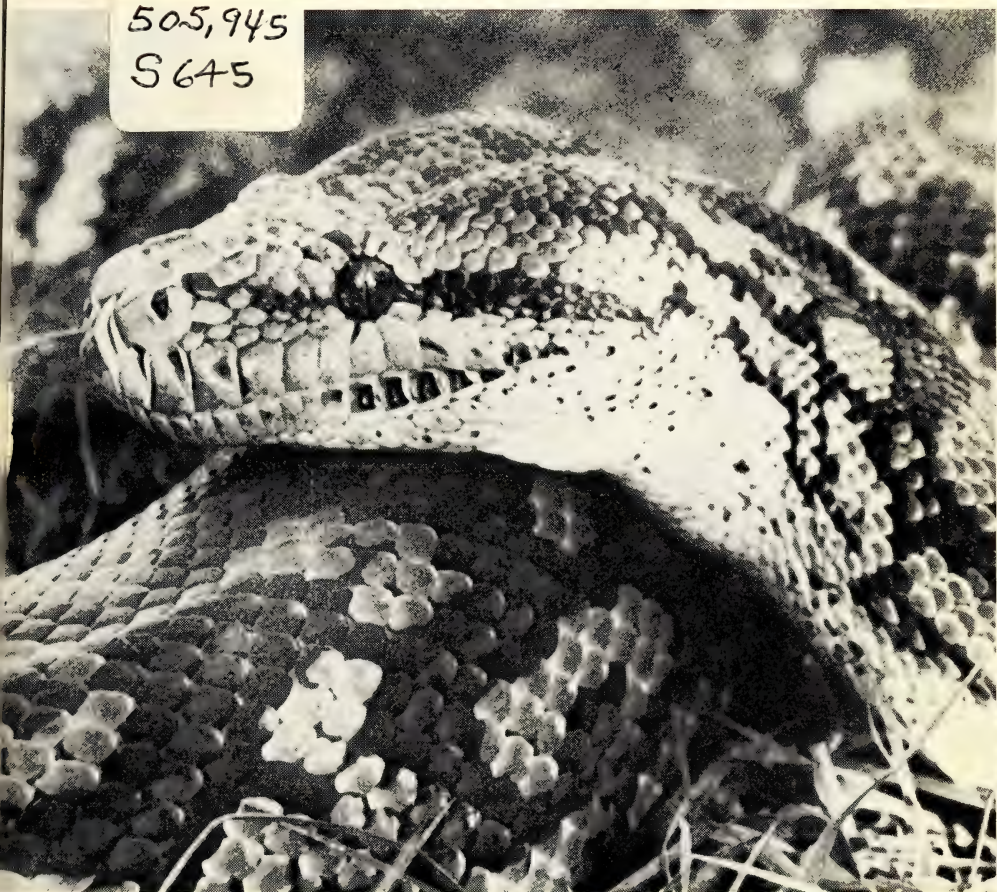
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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETINGS

Wednesday, 14 March — At National Herbarium, The Domain, South Yarra, commencing 8 p.m. Annual General Meeting with Presidential Address.

New Members:

Ordinary:

Miss Pamela D. Chatfield, 12/8 Pasley St., South Yarra 3141.
Mr. Geoff. Deason, 16 Olive Ave., Mt. Waverley. *Ornithology*.
Mrs. Jenny Dewhurst, 17 Legon Rd., South Oakleigh 3167. *Geology and Marine Biology*.
Mr. W. A. Dey, 3 Dorothy St., Pascoe Vale North 3044.
Mr. Robert Finlay, 304 High St. Road, Mt. Waverley 3149. *General*.
Miss Barbara A. Hadkinson, 19 Milverton St., Burwood 3125. *Ecology*.
Mrs. Coral Hayward, 14 Greenglade Court, Blackburn North 3130. *Botany*.
Mr. Robert L. Lukey, 30 Canterbury St., Flemington 3031. *Microscopy*.
Mrs. B. D. McCallum, 12 Bonfield Ave., Hawthorn 3123. *Mammals*.
Miss Gael Shannon, 247 Pigdon St., Nth. Carlton 3054. *General*.
Mr. John W. Zimmer, 38 Drummond St., South Blackburn 3130. *Marine Biology and Entomology*.

Joint:

Timothy Armstrong, 39 Anthony Drive, Mt. Waverley 3149.
Mrs. S. A. Riordan, 15 Regent St., East Brighton 3187.

Monday, 9 April — "Aboriginal Antiquities of Victoria": Mr. Aldo Massola.

GROUP MEETINGS

(8 p.m. at National Herbarium unless otherwise stated.)

Wednesday, 7 March — Geology Group. Speaker, Mr. Doug Myers. Subject, Kangaroo Island, illustrated with slides.

Thursday, 8 March — Botany Group.

Thursday, 15 March — Day Group will meet 11.30 a.m. at Park St. entrance to Botanic Gardens. At 1.15 an inspection of R.B.G. led by the Superintendent.

Wednesday, 21 March — Microscopical Group meeting. Mr. J. Dawes will speak on "The Medal and the Man behind it"; a story of scientists who have been presented with medals to commemorate their research achievements.

Monday, 2 April — Marine Biology and Entomology Group meeting at Library Conference Room, National Museum.

Wednesday, 4 April — Geology Group.

F.N.C.V. EXCURSIONS

Saturday, 10 March - Monday, 12 March — Shepparton. The coach will leave Flinders St. by Gas and Fuel Building at 9 a.m. Bring a picnic lunch and lunches will also be needed for Sunday and Monday.

Sunday, 18 March — Zoological Gardens. Meet outside Royal Park railway station at 11.15 a.m. and bring a picnic lunch.

Easter, Friday, 20 April-Wednesday, 25 April — Harrietville. Accommodation, dinner, bed and breakfast has been booked at Bon Accord. Hospice and lunches will be supplied if required. The cost of this excursion is \$45 and this amount should be paid to the excursion secretary by 9 April.

JUNIOR F.N.C. MEETINGS

Friday, 30 March — Hawthorn Juniors in Town Hall at 8 p.m.

Friday, 6 April — Preston Juniors at 281 High St., Preston (Rechabite Hall), at 8 p.m.

Friday, 13 April — Montmorency and District in Scout Hall, Petrie Park, at 8 p.m.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

Vol. 90, No. 3

7 March, 1973

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Front Cover:

This photograph of a Carpet Snake provides a link with the second part of Rambles in Raak, on page 52 of this issue.

John Wallis was the photographer.

Early Naturalist's Writings – 2

Rambles in Raak

(Continued)

The following morning we were up at 5.30, and after breakfast headed due south through the Tall Thickheads to the first one of the series of large "lake-beds" previously mentioned. Birdlife was fairly numerous, owing to the presence, probably, of a water trough fed from three iron tanks sunk in a small catchment on the northern slope of the depression. Here the drought resistant properties of the Native Tobacco, *Nicotiana suaveolens*, and the introduced Sea-green Tobacco, *Nicotiana glauca*, were demonstrated in an unmistakable manner. Prior to the recent drought the latter had taken complete possession of vast areas of the country, but at the termination of the aridity few, if any, of the trees remained alive, whilst in and among their dead boles and branches the native plant grew luxuriantly, and paraded its racemes of flowers triumphantly. It was not long before the monotonous sameness of the "lake-beds" induced us to change our course. Bearing west and then north, we came upon some interesting timbered country, wherein the Needle Hakea, the Sandalwood, the Bignonia Emu-bush, *Eremophila bignoniiflora*, and the Willow Acacia, *Acacia salicina*, abounded. The Hakea was frequented by the Black-eared Miner and the White-browed Babbler, *Pomatorhinus superciliosus*, and the Emu-bush by the Spiny-cheeked and Singing Honey-eaters. Among the more lowly forms of vegetation observed were the Club Moss Aster, *Olearia lepidophylla*, the Spreading Scurf-Pea, *Psoralea patens*, var. *cinerea*, the Stiff Westringia, *Westringia rigida*, the hairy *Blennodia*,

Blennodia lasiocarpa, and the Sand Brome and Scaly Meadow-grass, *Bromus arenarius* and *Poa lepida*. The Burr Forget-me-not, *Lappula concava*, and the Narrow Thread Petal, *Stenopetalum lineare*, grew profusely, the former occasioning us much inconvenience owing to the tenacity with which its fruitlets adhered by their spinular asperities to our clothing.

A nest of the Wedge-tailed Eagle, *Uroaëtus audax*, was found in a large tree of the Tall Mallee, associated with several Crows' nests. The food on which the eaglets had been nurtured was evidenced by scores of skulls and other skeletal parts of the rabbit that strewn the ground at the base of the tree. The reason of the association of the nests of the two birds might be surmised from the presence of these bones; the wily Crow, no doubt, having realized that, in the vicinity of the Eagles' eyrie, an abundant supply of food for itself and nestlings could be obtained with little exertion owing to the prodigal habits of the bird of prey. The Eagle's nest was a bulky one, and Johnny was induced to ascend the tree and pose therein whilst a series of photographs were taken. During this outing the number of pits of the ant lion that fretted the sandy soil occasioned surprise. So closely were they set that at every step at least a dozen of them were destroyed, and their concealed occupant perturbed.

On this ramble, and during our subsequent ones, we noticed particularly in the early morning and late in the evening, fresh moist soil on the lip of numerous narrow, elongated openings leading at an angle of 45° or

thereabouts into the ground. To our query relative to the identity of the creatures responsible for such excavations, Johnny replied, "Lizards, and when questioned as to the cause actuating them to burrow, he intimated that the lizards preyed on the trap-door spiders, and consequently had to dig to satisfy their desires. As the lidded domiciles of these spiders were extremely numerous in the friable soil, and ranged from the size of a pin's head to the diameter of a shilling, we assumed that the explanation given was correct, but with innate scepticism kept a watch to detect the lizard at its task. One evening, whilst returning in the gloaming to our hut after an extensive ramble, we chanced upon a pile of loose sand beside an excavation that undoubtedly proved, by its fresh appearance, to have been recently brought from below. Mining operations for the miner were at once instituted, and after attaining a depth of eight inches, the gentle insertion of the blade of a pocket-knife into the hole resulted in the prompt appearance of a dirty, moist, and aggressive specimen of the so-called Bloodsucker, *Amphibolurus muricatus*. Henceforth we readily recognized the tunnels made by this lizard, and made several futile efforts to establish the identity of the species, as we thought, that made a larger, though not so elongated, opening. At length we encountered one whose soil-heap was of more than the usual dimensions, and after a considerable amount of scratching dead-ended our quarry at a depth of eighteen inches — a large desert cockroach, which, on being submitted with other insects collected during the trip to Mr. J. A. Kershaw, Curator of the National Museum, proved to be *Geoscapheus robustus*.

Stranger than either of the two excavations mentioned was the circular hole, about the diameter of a half-

penny, that went down vertically, and had six or eight plugs of sand, from two to three inches in length, neatly piled at its orifice. How these had been piled upon one another; by what means were they formed; by what creature; and how had they been raised from below, were questions more easily asked than answered. With our fingers and a piece of wood we tried repeatedly, but unavailingly, to solve the miner's identity. Early one morning, having set out on an excursion of more than the usual radius, we chanced upon one of these circular holes with an accompanying pile of fresh sand-plugs. With a pannikin we sank a hole to the depth of three feet in the sandy loam before we brought to light the object of our quest — a large brown beetle, with a long, stout horn set in the middle of its head, and flanked by two smaller ones. It proved to be one of the Digger Beetles, *Bolboceras sloanei*. It would appear that, as the beetle delves vertically with its powerful foreclaws, it forces the excavated materials upwards between its abdomen and the wall of the shaft. When the burden above begins to incommode its operations, it backs up the shaft, forcing the plug upwards till it eventually topples over at the margin of the hole. However plausible this explanation may appear, there is one fact that seems to militate against its acceptance, and that is how each successive plug raised from below falls directly upon the previous one rather than elsewhere. The cohesion of the sand appeared to be ensured by means of a mycelium, for some of the fresh plugs examined were invested with a minute mesh, which might possibly have been derived from the spinnerets of some species of the spider tribe.

The object, hereabouts, of the habit of making excavations by the beetles and lizards, if not for the purpose of depositing eggs, must be to make pro-

vision to withstand, like the dingo, the dry season, by attaining the moisture that exists some little distance below the surface. Confirmatory evidence of such an acquired habit was recently published in the *Agricultural Journal* of the Union of South Africa, February, 1914, by Eugene N. Marais, in an article entitled "Notes on Some Effects of Extreme Drought in Waterberg, South Africa".

Along the lee side of the high water mark of some downpour that had temporarily covered the lowest part of the area of a "salt-pan" with a shallow sheet of turbid liquid, the remains of the cockroach *Geoscapheus robustus* could be collected in scores, having been surprised, possibly, in their underground retreats by the storm water, and on coming to the surface perished after protracted and unavailing struggles, and were then cast by the ripples on the shore, there to be entombed by the shifting sand, or eaten by the foraging fox or Lace Lizard. One of the latter, *Varanus gouldi*, was surprised by us whilst it was foraging for these insects on a "lake-bed", and in turn surprised us by the rapidity of its progress over the partially-wet sand and through the Pigface and Prickly Saltwort, *Salsola kali*.

Whilst dealing with insects, it might be here mentioned that it was noticeable, when fire was applied to a large clump of spinifex, the greater number of insects sheltering therein seemed loth to leave their domicile, and were either incinerated by the flames or over-powered by the heat when making a belated break for a safer haven. On the other hand, the moment the flames began to manifest their power, a general exodus of panic-stricken small snakes, lizards, beetles, spiders, grasshoppers, cockroaches, &c., ensued from clumps of spinifex some yards distant from the scene of the conflagration. It was noticeable also

that shortly after the smoke occasioned by the combustion of these large growths of tangled and pungent leaves had attained some little height in the heavens, Crows were to be discerned converging towards it from all points of the compass. From experience they appear to comprehend that where there is fire in the Mallee there will be found food in abundance. This peculiarity on the part of the Crow was repeatedly tested by Mr. A. W. Milligan during the course of his extensive ornithological excursions in Western Australia.

Whilst standing watching the play of the flames in a large growth of spinifex, we were surprised to notice an oyster-shell-shaped piece of loam, at the base of the clump, suddenly lift above the level of the surrounding soil, and a dark, hairy form peer forth from beneath the elevated lid with evident trepidation and then disappear. When the fire had exhausted itself we hastened forward to investigate the matter, and found two small oyster-shell-shaped lids leading to a circular shaft lined with a closely-woven, delicate web. Carefully applying tension to the lids, a silken bag, about eighteen inches in length and one and a half inches in diameter, was withdrawn from the hole, which it fitted perfectly. Slitting up the bag with a knife, we found that its recent occupant had remained in the hole, and that four inches of the end of the bag was wet and discoloured. Having no suitable article with us for excavation purposes we were left to speculate on the identity of the spider that constructed and occupied such a unique habitation.

During the burning of one very dry clump of spinifex, a large brown cockroach, that was fully two and a half inches in length and one and a half inches in breadth, issued from the grass and hurried towards us. The gigantic insect's approach was watched

with close attention and ready collecting bottles, but before it could cross the danger zone the flames spread out wide and low above it, and in an instant converted it into a scorched and shrivelled semblance of its former self. In all probability it was *Geoscaphus giganteus*.

Later in the day we bore east through the pines in the direction of Nowingi. In the area over which the pines exercised dominion the entire absence of young plants or trees did not fail to excite our attention. During all our extensive wanderings in Raak, as in the neighbourhood of Lake Mournpoul, not a single young plant, if we omit the Weeping Pittosporum, of any of the trees or shrubs met with was noticed. Fire seldom or never ravages the district, and the depredations of stock are unimportant or negligible. One is prompted to ask, Why is this so? What favourable conditions induced the contemporaneous growth of the pines and associated vegetation in the past, and, now that they have adapted themselves to their environment, how does it arise that they seem incapable of perpetuating their species? Among the pines we noted the Red-browed Tree-creeper, *Climacteris erythroptera*, but not elsewhere. The bird is shy, and seems to have acquired the silence of the shady vistas it frequents.

Maintaining an easterly course, we at length reached our destination — a large lake-bed containing a small area of shallow water. One of the party, discarding his boots and socks, ventured out into the water with a collecting net and bottle, with the view of securing some of its fauna. At no spot was the water of greater depth than two inches, but at every step the pond-life hunter sank knee-deep into the tenacious mud beneath. Subsequently he was obliged to make a lengthy barefooted pilgrimage along a path

thickly strewn with the fruit calyces of the Prickly-fruited Salt-bush, *Bassia echinopsila*, to a small puddle to cleanse his feet and legs. At this small puddle, evidently formed by a recent passing shower, we noted a greater number and variety of the feathered tribe than elsewhere. Among the more numerous species were the Bee-eater, *Merops ornatus*, and the Masked Wood-Swallow, *Artamus personatus*, both of which had just reached the Raak district on their annual migration. In a drooping Moonah, *Melaleuca parviflora*, growing beside the margin of a lake bed, we discovered the nest and eggs of the Striped Honey-eater, *Plectorhynchus lanceolatus*, and, in a pine tree, the nest and young of the Tawny Frogmouth, *Podargus strigoides*. The young birds appeared very grotesque in their soft white investiture and seemed not more than three weeks old, and incapable of much exertion; yet, on repairing to the tree the following morning to secure a photograph of the mother bird and her brood, we found the nest deserted. Returning homewards at nightfall, we encountered several Black-faced Kangaroo *Macropus melanops*, and collected the Desert Cassia, *Cassia eremophila*, var. *platypoda*. At one time this plant was very plentiful hereabouts, but now, owing to the partiality shown by the rabbits for its leaves and tender twigs, it is seldom met with. Fortunately for the few plants that still survive, the recent drought dealt as effectively with the rabbits in the Raak district as it did with the introduced Tree Tobacco.

In company with Mr. Charles Thompson, of Kulkyn station, we set out one morning at 7.45 for the purpose of searching the mallee about eight miles to the north of the hut for the nesting-mounds of the Mallee Fowl, *Leipoa ocellata*. Bearing north by east, we crossed a large lake-bed,

and forced our way through a bewildering interlacement of dead and prostrate trees of the Sea-green Tobacco, interspersed with sturdy growths of the Silky Blue-bush, *Kochia villosa*, and the Native Tobacco. Beyond this the Berrigan, the flowering Sandalwood, and the fruit-bearing Sweet Quandong prevailed in more or less abundance till the belt of Belar and Buloke already described was reached. On its northern margin a narrow-leaved form of the Giant Hopbush, *Dodonaea viscosa*, var. *angustifolia*, was met with, and occasional mounds of copi. The Oil and the Tall Mallee succeeded, and, with pines and spinifex interspersed, stretched away northwards as far as the eye could reach.

As we continued in the direction mentioned at a leisurely pace, keeping a keen look-out for the objects of our quest, we noted many flowering plants and shrubs. The most prominent of these were the Green Prostanthera, *Prostanthera chlorantha*, the Spreading Flax-Lily, *Dianella revoluta*, the Holly Grevillea, *Grevillea ilicifolia*, var. *lobata*, the Lambs' Tails, *Trichinium exaltatum*, and the Sand Twinleaf, *Zygophyllum ammophilum*. Several specimens of the Rusty-hood Orchid, *Pterostylus rufa*, the Desert Boronia, *Boronia clavellifolia*, and the Golden Pennants, *Loudonia Behrii*, were met with, but in every instance these were long past the prime of flowering splendour. The Sweet Appleberry, *Billardiera cymosa*, and the been accidentally broken by the bird in the course of one of its periodic inspections, and then discarded. Opening up the mound, we found it to contain but one egg. Later on another Large Dodder Laurel, *Cassytha melantha*, were much in evidence, the former twining about the base of the eucalypti and the latter sprawling over their tops.

Making a short traverse to the west, we encountered a mound of the Mallee-Fowl, and beside it an egg, much scratched, and having a small hole in the side. As the mound showed no signs of being disturbed by other than its maker, the egg may have mound was investigated, with similar result.

Wandering haphazard through the mallee and spinifex, we were fortunate in obtaining a glimpse of a *Leipoa*. The bird was standing erect and motionless, listening attentively to the noise we occasioned in our progress through the investing vegetation. The moment it detected us, however, it wheeled about, and, with lowered head, disappeared at a rapid run among the spinifex and low mallee. Hastening forward, we discovered its mound, and on opening it up found that it contained four eggs. These were arranged in the form of a circle, the larger end being upward, and projected slightly towards the centre of the small circular excavation around and over which the sand, bark, leaves, and twigs gathered by the bird were heaped. So far as we could see from an inspection of these mounds, and others subsequently met with, the bird was not actuated, as has been alleged, by any motive in the selection of a site other than expediency. Some were closely invested with *Eucalyptus incrassata*, var. *angulosa*, and others were practically destitute of cover.

In the selection of the sites for the mounds examined by us, the birds certainly gave no heed whether an opening occurred or not in the surrounding vegetation to the north and east to permit of the unimpeded rays of the sun falling on the mound. Possibly they realized, as we did, that the impediment offered to the sun's rays by the foliage of the mallee, particularly during the spring and summer months, is more imaginary than real. In every

instance the immediate vicinity of the mounds presented a clean appearance by reason of the removal by the bird of all leaves, twigs, and bark within a radius of twenty feet or thereabouts. From the number of holes observed in the sand at the base of the pines we assumed the birds spend much of their leisure in sun-bathing. By this time the heat and flies had become almost unbearable, and, to accentuate the unpleasantness, a dust-laden north wind sprang up and gradually increased in temperature and intensity. Hastening south, we at length arrived, heated and uncomfortable, at Brigh-ton's Tank, which comprised two small, shallow, oblong, artificial excavations, in a natural depression, containing a few thousand gallons of turbid water. Here we refreshed, and rested in the shade of the pines.

In order to ascertain the extent to which this tank was frequented by the birds and marsupials of the locality, we repaired to it later, and, ensconcing in selected positions, awaited the coming of dusk. As the gloom deepened the flies that had plagued us exceedingly all day withdrew, and small but energetic mosquitoes began to dispense their favours without fear or impartiality; the stridulations of the mole crickets, *Gryllotalpa coarctata*, gradually decreased in volume and intensity; the belated calls of the Crested Oreocica, the Pallid Cuckoo, *Cuculus pallidus*, and the White-winged Chough finally ceased, and the prevailing quiet was broken only by the grating of the large windmill near at hand, the plaintive calls of the Curlews, and the low "Peep, peep" of a pair of tiny Black-breasted Plover as they paraded the muddy margin of the tank. A Large-tailed Nightjar, *Caprimulgus macrurus*, flits into our rapidly-lessening range of view, circles noiselessly above our heads, and then alights on the ground

a few yards distant from us to seize a mole cricket its keen eyes had detected. A period of quietude ensues; then, with whistling pinions, a pair of Bronze-wings alight on the ground near at hand, and, after a careful survey of their surroundings, run to the water's edge and drink long and deeply. They depart in due course, and we wait patiently but unavailingly for the next visitant, and then stroll homewards, our route illuminated by repeated vivid flashes of lightning—the precursors of the rain clouds that shed some of their contents on Raak during the night. The outcome of our visit was disappointing; but had it been undertaken later in the season, when the heat had wilted the succulent plants that carpeted the ground, better results would have undoubtedly attended it. In support of this contention, we might mention that the cattle and horses depasturing on Raak had not been near water for over four months prior to our arrival, owing to the Common Sow-thistle, *Sonchus oleraceus*, on which they practically lived, containing sufficient moisture to satisfy their thirst.

Shortly after 9 o'clock one morning, when some miles south-east of the hut, we came upon a tree possessed of several trunks, all of which were piped, and, as we considered, eminently suitable for affording shelter to an Owl-Swallow, *Ægotheles novæ-hollandiæ*. Each in turn was subjected to a careful investigation, and so occupied were we in this task that we failed to notice a bulky Carpet Snake, *Morelia variegata*, slightly over seven feet in length, that was indulging in an early sun-bath on one of the trunks, in close proximity to an enthusiastic ornithologist's hand. At the alarm signal the whereabouts of a suitable waddy was as vital as the snake's. On divining the identity of

the disturbing factor, however, cameras were hastily dragged from their cases and as hastily screwed to tripods. Becoming alarmed at the unusual disturbance in proximity to its domicile, the snake decided to retire into a hollow spout. Johnny, however, frustrated this design by plugging the hole with his soft felt hat. As the baffled reptile coiled about the entrance a bat issued from out of a smaller exit, and, struggling frantically over several of the ophidian's folds, fell to the ground and simulated death. The snake now resolved to go aloft, and in a few moments lay extended along a small limb some fifteen feet from the ground. This situation not being deemed sufficiently elevated above the danger zone, an effort was immediately made to reach the shelter of the dense foliage above. Slowly the snake erected itself till over six feet of its length was poised rigidly and vertically above the limb on which it rested. The feat was a surprising one to us, and served to demonstrate the great muscular power possessed by these constrictors. The moment the reptile's head reached the upper limb it released its hold of the lower one, and quickly drew its body into the supposed haven of safety and concealment. Johnny now ascended the tree, and summarily shook the snake to earth, where it was measured and examined, and then carried without protest to a neighbouring small bush and photographed, after which, being unfortunately unprovided with a bag or spirit bottle of sufficient size, we left it to glide away to its shelter tree unharmed.

From various causes a visit to the Double Tanks, distant about six miles due west of the hut was deferred almost to the day of our departure from Raak. The route thither lay for the first mile or so over open country, and then through a forest comprising

mostly pine and Belar. Amongst the most conspicuous of the flowering composites noted were the May Weed Sunray, *Helipterum cotula*, the Fringe Daisy, *Brachycome ciliaris*, the Pointed Everlasting, *Helichrysum apiculatum*, and the Soft Millotia, *Millotia tenuifolia*. On issuing from the timber we ascended a sand-ridge and beheld an extensive lake-bed, comprising some thousands of acres, extending for miles to the south and the west. Far off, across this monotonous level depression, which was thickly invested with the Dwarf Salt-bush, a light-coloured patch marked the site of Warrick's Tank. Thither we directed our steps, and on reaching the tank found it overgrown with the Sea Heath and Sea Glasswort. Continuing onwards, we at length reached the Double Tanks—two oblong, shallow, artificial excavations. The water impounded was fresh, though slightly discoloured, and its muddy margins were fretted with the tracks of many varieties of the feathered tribe. As at Brighton's Tank, no indications were noted of either stock or marsupials having resorted to water for a lengthy period. In and about the shallows the Spoon Mudwort, *Limosella Curdiana*, the Dwarf Arrow-grass, *Triglochin centrocarpa*, and the Trefoil Pennywort, *Hydrocotyle medicaginoides*, grew luxuriantly. On the return journey a fine specimen of the lizard *Varanus gouldi* was captured far out on the lake-bed, and the White-winged Wren-Warbler, *Malurus leucopierus*, noted among the Dillon bushes.

On Saturday evening Mr. Stone left for Nowingi to catch the 4.20 train on Sunday morning to Mildura. The following afternoon Mr. A. W. Milligan and I bade adieu to the picturesque spot where we had spent so many pleasant hours, and, journeying east, reached Nowingi in time to erect our tent, partake of tea, and make our-

selves comfortable before nightfall. Early Monday morning the crowded train from Mildura pulled up at Nowingi, and we clambered aboard, to stand the greater part of the journey to the city, where we arrived shortly before midnight, with barely sufficient time available to catch the last train to our respective suburbs.

In conclusion, we wish to express our thanks to Mr. J. A. Kershaw, F.E.S., for his kindness in furnishing us with several specimen jars, and subsequently identifying the insects, &c., submitted to him; and to Mr. J. R. Tovey, of the National Herbarium, for identifying and supplying us with the vernacular names of the plants collected. All the ornithological and entomological specimens have been presented to the National Museum, Melbourne.

Among the insects handed to Mr. Kershaw for the Museum he has identified the following:—Coleoptera: *Bolboceras sloanei*, Blbk.; *Cubicorrhinchus calcaratus*, MacI. (rare for Victoria). Hymenoptera: *Ephutermorpha formicaria*, Fabr. (female). Orthoptera: *Tinzeda albosignata*, Brun. (male); *Euzosteria subverrucosa*,? White (a cockroach, immature, a rare species); *Plana (Geoscapheus) robustus*, Tepp. (a cockroach). Neuroptera: *Glenurus*? (young larva). Hemiptera: *Charocerus paganus*? (immature). Spider — *Argiope*, sp.?

In some material handed to Mr. J. Searle from the salt-pans he identified the Crustaceans *Paratemia zietziana* and *Estheria packardi*. Some material from a freshwater dam yielded *Daphnia carinata* and a copepod which will probably prove to be new.

The Leathery Puff Ball

In the *Victorian Naturalist* for August, 1972, Marginson and Murray-Smith recorded the collection, in the summer of 1970-71, of the Leathery Puffball, *Mycenastrum corium*, on Erith Island in Bass Strait (picture, Page 221).

It is of interest that in the same summer this fungus was found on sand dunes by Mr. Mathieson of the Warrnambool Field Naturalists Club, presumably in his home district of Nullawarre. Knowing of my interest he very kindly sent me a couple of dried specimens. The largest one measured 37 cm (14½ ins) in circumference and was 10 cm in depth. Identification was later confirmed by Mr Willis.

This imposing puffball is usually considered to be a plant of the dry

mallee country. A search of mycological literature at hand yielded only one reference to *Mycenastrum*, in Blandford's Handbook. This suggested that it should be looked for among grass in parks. The fungus lacks a sterile base and when ripe the leathery peridium splits back from the top centre, releasing the dense mass of spores. If gathered before this stage the skin as it dries merely cracks into a mosaic pattern, keeping the fruit body intact.

As all puffballs are reputedly edible if taken in the firm white stage, one can imagine the succulent cutlets that could be sliced from a specimen as large as this.

Ellen Lyndon,
Leongatha.

The Impact of the Ethane Pipeline on the Marine Ecosystem of Port Phillip Bay, Victoria

by JEANETTE E. WATSON*

SUMMARY

This paper is a resume of a report on the impact of the ethane pipeline on the marine ecosystem of Port Phillip Bay, Victoria. The 29km of pipeline, buried beneath the seafloor, passes through the sandy and muddy regions of northern Port Phillip Bay. The marine communities were little effected by the laying of the pipeline; regeneration of invertebrates was well advanced within weeks of completion of the operation. Species most sensitive to environmental disturbance showed the most rapid regeneration rates.

INTRODUCTION

Prior to the commencement of work on the ethane pipeline, permission was sought from Esso Australia Ltd. to undertake a study of the impact of the operation on the marine environment of Port Phillip Bay.

Permission to carry out the study was readily granted, and this paper is the result of information gained from observations carried out during the construction of the pipeline.

In view of the claims of potential threat to the marine ecosystem of Port Phillip Bay put forward by those opposed to the construction of the pipeline, and more importantly, the fact that no similar study has been made in Australian waters, it was considered an excellent opportunity to investigate the effects of the operation on the marine biota of the bay.

PHYSIOGRAPHY OF PORT PHILLIP BAY

Port Phillip Bay is a drowned graben downthrown between the Bellarine and Rowsley Faults to the west and Selwyns Fault to the east.

The sunkland to the north of Port Phillip is drained by the Yarra and Werribee Rivers. The ancestral river system, of which these streams are merely betrunked tributaries, passes down what is now the central bay region into Bass Strait, via Port Phillip Heads.

The channels of this drowned river system have now been infilled by a thick layer of mud and clay in the central region, with a sedimentational gradient towards coarser sands in the peripheral inshore regions. (Fig. 1.)

THE MARINE COMMUNITIES

The benthic communities of Port Phillip have been briefly described in the "Port Phillip Survey, 1957-1963", Memoirs 27 and 32 of the National Museum of Victoria.

Species distribution of the soft bottom communities of Port Phillip Bay is closely related to the sedimentary pattern of the seafloor. In the inshore region, where there is relatively firm substrate, epibenthic species are dominant. In the muddy offshore region, the benthos comprises mainly burrowing infaunal organisms, and the few epifaunal species present are adapted to survival at the seafloor surface in highly depositional conditions.

In the area of Port Phillip Bay concerned in this study, algae are a minor constituent of the benthic community. This is mainly due to the absence of reef, as well as to sediment in suspension reducing light transmission to the seafloor below a critical level for photosynthesis.

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CONSTRUCTION OF THE ETHANE PIPELINE

from Mordialloc beach on 16 June, 1972. The 29km (approx.) of pipeline was laid in the following 4 months, and was completed at Altona refinery early in November, 1972.

A bucket dredge moved ahead of the pipe-laying barge, opening a trench 5m wide and 3m deep in the seafloor. Pipelaying was a continuous

operation, each 12m length of pipe being welded and inspected before being laid in the trench.

After laying the pipe, the trench remained open for at least 2 weeks, and was then filled by dumping dredged material from hopper barges positioned above the trench. If necessary, backfill was later raked into the trench by a special barge, to produce a surface almost flush with the pre-existing seafloor. Where backfilling has

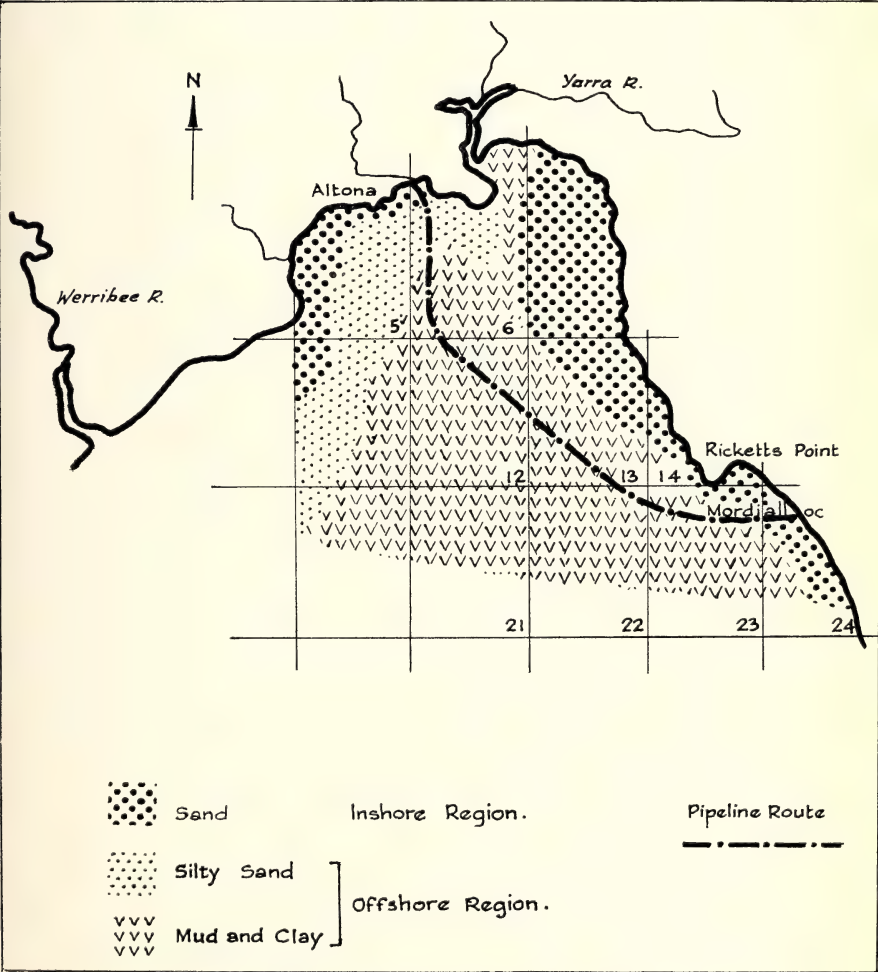


Fig. 1. Northern Port Phillip Bay.
Map shows Grid References and seafloor sedimentology, from Memoir 27,
National Museum of Victoria.

been completely successful, the pipeline is now buried beneath 2m of sediment.

METHODS

After dredging, and during the pipe-laying operation, the trench was inspected at regular intervals by the author, in a total of 8 hours underwater.

Sectors of the trench left open for some time before backfilling, and sites already backfilled were also investigated.

During the first inspection, where underwater visibility permitted, the seafloor adjacent to the trench was also examined to establish a comparative basis for estimating the impact of the operation on the marine ecosystem.

ECOLOGY

Only sessile and sedentary invertebrates are considered in this study. Since fish are able to move away from the centre of a disturbance, the operation has had no effect on fish life. (Opening the trench, however, with exposure of food organisms, encouraged a temporary influx of fish, mainly flathead, into the area.)

1. The Inshore Communities

The communities of the inshore region are adapted to mild water movement due to wave action in shallow (0-10m) water, to coarser, well compacted sediments, and to reasonable light transmission to the seafloor.

Sessile epibenthic species are important in the inshore community. As there is very little hard substrate, reef dwelling species, as well as algae, are rare.

The epifaunal community is dominated by the large solitary ascidian *Pyura stolonifera praeputialis* which grows singly, or in clusters of several individuals, attaining a density of 8/m². It is firmly an-

chored in the substrate by long stolonoid roots.

P. stolonifera supports a secondary epifauna comprising mainly crabs and gastropods, which live among the growths of the red alga *Neomonospora elongata* common on the leathery test.

Other important epibenthic species are small red and yellow sponges living on old shell, and the bivalves *Ostrea angasi* (oysters) and *Pecten alba* (scallops).

The infaunal community is dominated by the bivalves *Tawera gallinula* and *Fulvia tenuicostata*, with occasional *Callanaites disjecta*, and where the sediments are finer, *Notospisula trigonella*.

2. The Offshore Communities

The communities of this region are adapted to soft unconsolidated sediments in deeper (10-18m) permanently turbid water, through which light transmission is extremely poor.

The communities are dominated by burrowing infaunal organisms, with a few epifaunal filter feeders adapted to highly depositional conditions, living at the seafloor surface. The dominant member of the infaunal community is the small burrowing echinoid *Echinocardium cordatum* which ranges in density to 50/m². Other common organisms are polychaete worms and the brittle stars *Amphiura constricta* and *A. elandiformis*.

The epibenthic community comprises clusters of the sabellid worm *Myxicola infundibulum*, occasional scallops, *Pecten alba*, and mussels, *Mytilus planulatus*, attached to old oyster shell. Both scallops and mussels support a sparse secondary epifauna of the bryozoan *Amathia tortuosa*, and the hydroid, *Obelia australis*.

IMPACT OF THE OPERATIONS ON THE ECOSYSTEM

Generally, the dredging was very clean, and apart from the removal of the benthos directly in the path of the dredge, there was minimal disturbance to the ecosystem.

In some areas, however, particularly in the muddy offshore region, fine sediments up to 10cm thick were deposited for distances up to several metres alongside the trench. The effects of this sedimentation were minor, as in most cases, the motile fauna, such as *Echinocardium*, crabs and scallops, simply moved back through the layers of sediment to the seafloor surface.

The mortality rate due to sedimentation from dredging was highest among the epifaunal community of the inshore region, where filter feeders such as sponges and *Pyura stolonifera* succumbed.

Several sections of the trench left open for some weeks after dredging were examined at regular intervals. These open sections acted as traps for dead and dying organisms, mainly the red alga *Neomonospora elongata*, and the pelagic jellyfish *Cyanea annaskala*, which are washed in great numbers along the seafloor by wave and mild current action.

One sector of the trench left open off Ricketts Point showed a dense primary settlement of colonies of the hydroid *Campanularia angulosa* which reached maturity within 4 weeks of dredging. Several juvenile echinoids, *Heliocidaris erythrogramma*, had also taken up residence beneath broken rock in the walls of the trench shortly after dredging.

Backfilling by dumping was reasonably successful, but in some areas, fines spread out for several metres

from the trench, covering the seafloor in a layer of fine mud to depths of 15cm. This was particularly noticeable in the offshore region, where very fine sediment was dumped through depths of 15m; however, as the fauna of this region is adapted to heavy sedimentation, little disturbance was evident.

Raking proved to be the most destructive part of the operation, accounting for a mortality of up to 70% of the fauna by dislodgement and smothering in certain localised areas.

In places where backfilling has not been entirely successful, the site of the trench is marked by a shallow depression in the seafloor. This hollow provides shelter for a few species of worms and fish.

Sections of the closed trench which have been inspected show that regeneration by migration of vagile species and settlement of larvae has been remarkably rapid.

Hydroid colonies, *Obelia australis* and *Campanularia angulosa*, appear within 1-2 weeks, growing to sexual maturity within 2-4 weeks. Other primary settlers which have colonised the pipeline within 4-5 weeks of backfilling are the solitary ascidian *Ascidia gemmata* and the compound species, *Sycozoa tenuicaulis*, both of which settle on old shell.

The polychaete worm *Chaetopterus* species, which prefers quiet water conditions and soft sediments, has settled prolifically where these conditions prevail.

The burrowing infauna has returned into the sediments above the pipeline within a few weeks of backfilling.

Observations of the effect of the operations on the ecologically important macrobenthos is summarised in the following tables:

TABLE 1.
INSHORE REGION

EPIFAUNAL COMMUNITY	INFAUNAL COMMUNITY	Dominant species	Abundance	Survival rate	Regeneration over pipeline	Mode of regeneration
		Bivalves	mod. common	good	1-2 years (est.)	migration of adults, larval settlement
		Polychaete worms	mod. common	good	rapid	migration of adults
		<i>Chaetopterus</i> sp.	mod. common	poor	rapid 4-5 weeks	larval settlement
		<i>Mytilus planulatus</i>	mod. common	good	2 years to adult (est.)	larval settlement
		<i>Pecten alba</i>	mod. common	good	rapid	migration of adults, larval settlement
		<i>Pyura stolonifera</i>	common	poor	unknown	larval settlement
		<i>Ascidia gemmata</i>	occasional	poor	rapid 4-5 weeks	larval settlement
		<i>Sycozoa tenuicaulis</i>	occasional	poor	rapid 5-6 weeks	larval settlement
		Sponges	mod. common	poor	several months	larval settlement

TABLE 2.
OFFSHORE REGION

EPIFAUNAL COMMUNITY	INFAUNAL COMMUNITY	Dominant species	Abundance	Survival rate	Regeneration over pipeline	Mode of regeneration
		<i>Echinocardium cordatum</i>	very common	high	rapid	migration of adults
		Polychaete worms	common	high	rapid	migration of adults
		<i>Amphiura</i> spp.	common	high	rapid	migration of adults
		Bivalves	common	moderate	unknown	migration of adults, larval settlement

TABLE 2 (continued)

OFFSHORE REGION

Dominant species	Abundance	Survival rate	Regeneration over pipeline	Mode of regeneration
<i>Myxicola infundibulum</i>	common	poor	unknown	larval settlement
<i>Mytilus planulatus</i>	very common	good	2 years to adult (est.)	larval settlement
<i>Pecten alba</i>	mod. common	good	rapid	migration of adults, larval settlement
<i>Campanularia angulosa</i>	occasional	poor	2-4 weeks rapid	larval settlement
<i>Obelia australis</i>	common	poor	rapid 2-4 weeks	larval settlement
<i>Amathia tortuosa</i>	very common	poor	several months	larval settlement
Brachyura	common	good	rapid	migration of adults

CONCLUSION

The operations associated with the laying of the ethane pipeline across Port Phillip Bay have had an almost negligible effect upon the marine benthos along the pipeline route.

Only those organisms uprooted by the dredge, or smothered by sediment in later operations were effected, and mortality was largely confined to the filter feeding epifauna of the inshore regions which were unable to adjust to sudden excesses of sediment. Back-filling produced isolated instances of considerable stress, the inshore community again being the worst effected, with mortality rates rising locally to 70%.

However, in the muddy offshore region (approximately 20km, almost 70% of the total pipeline route) dredging and filling caused little disturbance to the biota, as the benthic

communities of this region comprise species well adapted to depositional conditions.

The operation had no effect on the fish population, as fish are able to avoid centres of disturbance. However, a considerable temporary increase in juvenile flathead occurred during dredging.

Primary settlement by larvae of common invertebrate species was extremely rapid. Those species which most readily succumbed to environmental stress, conversely, showed the most rapid regeneration rates.

ACKNOWLEDGEMENTS

I wish to thank Esso Australia Limited for permission to carry out this study; Australian Pipeline Construction for provision of workboats, and Mr. Henri Bource for advice and assistance with the underwater work.

Back o' Bunyip

by VICTOR JACOBS

In the *Victorian Naturalist* **85** (8), an article titled "Whipstick Nature-trail" was published. It was hoped then that similar articles would follow; and so here is the second nature-trail.

This 30-mile tour covers a wide variety of scenery and habitats in both agricultural and natural areas. It is not intended to be a botanical survey, and the plants dealt with are especially those that present themselves easily to the car driver who has only one eye on the road. If you make your run in the spring, you will most likely see those which the writer saw; but if you go in some other season you may discover some other delights.

The map is not to scale. The route starts just past the 49-mile post from Melbourne, at the Golden Fleece Service Station, and heads north. The figures at the junctions, or intersections indicate distances from the starting point. The text, too, contains figures to indicate points of interest or positions of species; and these distances are also recorded from the start.

Thirty miles may not sound too far; yet a very full day can be had if one explores all the little corners. There are some delightful picnic spots, so take your billy and some "tucker". If time or interest becomes short, and you wish to curtail the route and head for home, you may reduce the route by about 12 miles and continue straight ahead at Link Road and travel home through Gembrook.

1.0 MITCHELL ROAD ON THE LEFT.

The little creek has Long Purple Flags (*Patersonia longiscapa*) and a good stand of Woolly Tea Tree (*Leptospermum lanigerum* syn. *L. pubescens*). Just past the corner, on

the left, a bright patch of yellow may catch your eye. It is the introduced Flax-leaf Broom (*Genista linifolia* syn. *Cytisus linifolius*).

1.5 Good stands of Spreading Acacia (*Acacia diffusa*), Scented Paperbark (*Melaleuca squarrosa*), Yellow Hakea (*Hakea nodosa*) and Golden Bush-pea (*Pultenaea gunnii*).

1.8 Hairpin Banksia (*Banksia spinulosa*).

2.2 TURN RIGHT INTO STEEDMAN'S ROAD.

2.4 Here the patches of blue and yellow are Blue Dampiera (*Dampiera stricta*) and Spike Acacia (*Acacia oxycedrus*). There is also much Coral Heath (*Epacris microphylla*) and two more peas; Showy Parrorpea (*Dillwynia sericea* -D. *floribunda* of Ewart's Flora) and Swamp Bush-pea (*Pultenaea weidorferii*). The *Pultenaea* is deep orange and the *Dillwynia* of a paler yellow; and if the leaves are examined the former will be seen to have stipules while the latter has none.

2.7 Wiry Baurea (*Bauera rubiodes*).

4.0 Myrtle Wattle (*Acacia myrtifolia*), Borgan (*Leptospermum phyllicoides* syn. *L. ericoides* and also *Kunzea peduncularis*) and Sweet Bursaria (*Bursaria spinosa*).

4.8 A colony of bellbirds.

5.2 Here, a culvert. Furze Hakea (*Hakea ulicina*) and Trailing Goodenia (*Goodenia lanata*) with rather smaller leaves than regularly.

5.8 Diamond Creek. Woolly Tea Tree, pink and white Wiry Bauera and a yellow pea. You may care to choose between the Swamp and Golden Bush peas and the Showy Parrot pea. The genera are separated by the stipules or lack of them and the Swamp Bush-pea separated from the Golden Bush pea by the former having glabrous sepals and the latter hairy ones.

6.0 Coral Heath and Common Heath (*Epacris impressa*) as well as Wiry Bauera and Spike Acacia.

6.2 WITH JOLLEY ROAD ON YOUR LEFT PROCEED AHEAD THROUGH THE SWAMP, AND PARK IN THE FIREBREAK AMONGST THE TIMBER. This little swamp is a botanist's paradise, and is frequented by many snakes. Remember that you are the visitors, and that they belong to this environment — therefore discretion should be used towards the killing of them.

In and around the swamp you should be able to find Yellow and Furze Hakeas, Dagger Hakea (*Hakea teretifolia*) with slender fruits, and Silky Hakea (*Hakea sericea*). Also Scented Paperbark, Showy Parrot-pea, Pink Dampieras (amongst the predominating blue ones), Tall Sundew (*Drosera auriculata*), Fairies' Aprons (*Utricularia dichotoma*) (you may care to search for the tiny bladders used for trapping nitronogenous food), Hairpin Banksia, many forms of Variable Sallow Wattle (*Acacia mucronata*), our two Bush Peas, Rough Daisy-bush (*Olearia asterotricha*), and Slender Rice-flower (*Pimelea linifolia*).

The Rufous Whistler's glorious song may be heard here, as well as the sighting of Crimson Rosellas.

RETRACE ROUTE TO SIGN ON CORNER.

6.5 TURN RIGHT INTO JOLLEY ROAD.

7.4 TURN RIGHT INTO TOWT'S TRACK.

7.7 The hill levels a little here. Dusty Miller (*Spyridium parvifolium*), Holly Lomatia (*Lomatia ilicifolium*), Bundled Guinea-flower (*Hibbertia fasciculata*), Correa sp., Pink-eye (*Tetradlea ciliata*), Silver Banksia (*Banksia marginata*), Showy Daisy-bush (*Olearia lirata*), Austral Pincushion (*Brunonia australis*), Nodding Blue-lily (*Stypanandra glauca*), and Low-growing Green Groundberry (*Acrotriche seratula*), may all be seen.

7.9 Amidst an almost pure stand of Myrtle Wattle there occurs some tall Golden Tip (*Goodia lotifolia*), the lovely Large-leaf Bush Pea (*Pultenaea daphnoides*), Common Maidenhair Fern (*Andiantum aethiopicum*) and Hop Goodenia (*Goodenia ovata*).

8.0 If you have been working hard enough to deserve a meal, there is a good open space to the right of a sharp left-hand bend.

8.5 A large stand of Large-leaf Bush-pea.

9.1 Running Postman (*Kennedia prostrata*) beside the road; and off the track is an area worth searching for orchids.

9.3 PASS THE BURGESS ROAD ON LEFT.

9.9 A rocky hillside on the left with a gully and a patch of Handsome Flat-pea (*Platylobium fotmosum*).

10.1 Rough Bush-pea (*Pultenaea scabra*).

10. A SHARP LEFT TURN PUTS THE PROHIBITED AREA TRACK IMMEDIATELY TO THE REAR.

Prickly Bush-pea (*Pultenaea juniperina*) is here, and there are more orchids on the slopes to either side.

10.5 A bridge crosses a small creek,

where many bellbirds call; the following plants are numerous — Prickly Moses (*Acacia verticillata*), Rough Bush-pea, Golden Tip, Handsome Flat-pea, Christmas Bush (*Prostanthera lasianthos*), Cherry Ballart (*Exocarpus cupressiformis*), Pink-eye, and Coral Fern (*Gleichenia circinata*).

11.0 Heath Rice-flower (*Pimelea phyllicoides*), Blue Dampiera, Trigger Plant (*Stylidium graminifoli-*

um), Spreading Acacia, Common Heath, Silver and Hairpin Banksias occur here.

It was at this point that we reached one of the delights of the journey. This was a series of low banks usually on the left of the road and formed by the contouring of the road in this gradually undulating countryside. Stop every so often and take a step up into a different world of knee-deep grasses and herbs, scattered trees, and here

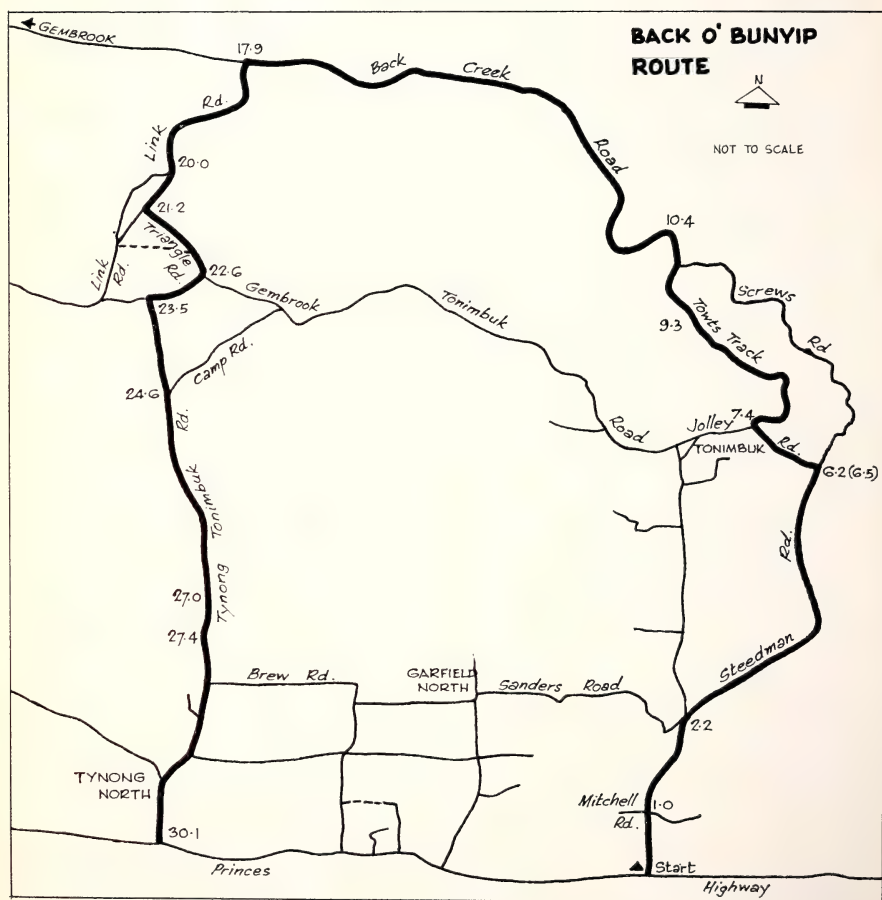


Figure 1 — Nature-trail route (not to scale).

and there dense shrubs. The wealth of herbs is sure to include Heath Milk-wort (*Polygala ericinum*) and Milk-maids (*Burchardia umbellata*). Some of the dense patches are of Silky Tea-tree (*Leptospermum myrsinoides*).

11.2 This low bank continues to 11.9.

12.9 Another low heathy bank as just described.

13.2 We are now running parallel to the new (1971) S.E.C. power lines. The area cleared for them even then showed promise in its initial regeneration and is worthy of investigation.

14.3 Starting to climb a range of hills.

15.3 Picnic Area before a bridge.

15.4 Heathy bank on left. Narrow-leaf Bitter-pea (*Daviesia corymbosa*), Heath Milkwort, Small Grass-tree (*Xanthorrhoea minor*).

15.9 A patch of blue was resolved to be a group of Scented Sun Orchids hiding amidst the roadside vegetation. I wonder how much earlier the keener eyed would have seen one. On the bank, an almost prostrate form of Spreading Wattle with slender phyllodes occurs.

17.8 The novel well-named Curly Wig (*Caustis flexuosa*) is scattered here as well as Gorse Bitter-pea, Narrow-leaved Bitter-pea, and many more Scented Sun-orchids (one with six stems and thirty flowers).

17.9 TURN LEFT INTO LINK ROAD OR CONTINUE ON TO GEMBROOK AS EARLIER SUGGESTED TO SHORTEN THE CIRCUIT.

(In 1971 the first dip lacked a culvert and posed a hazard, being rather boggy underwheel. If you can get through this semi-bog or the road has been improved, the rest of the circuit back to the highway holds no other hidden dangers.)

18.1 The habitat is quite different with its deep gullies, heavy loam

soil, dense cover and higher rainfall. Common species are Hazel Pomaderris (*Pomaderris apetala*), Stinkwood or Forest Ziena (*Ziena arborescens*), which was formerly confused with *Z. smithii*, confined in Victoria to far East Gippsland, Blanket Leaf (*Bedfordia salicina*), Silver Wattle (*Acacia dealbata*), Prickly Moses, Hop Goodenia and Tough Rice-flower (*Pimelea axiflora*).

19.1 Culvert over ferny creek. Snowy Daisy-bush, Pink and White Pink-eye, Wiry Bauera, Rough and Prickly Bush-peas.

19.3 Rough Star-hair (*Astrotricha asperifolia*), Creamy Stackhousia (*Stackhousia monogyna*), Bundled Guinea-flower, Rough Bush-pea.

19.8 Elderberry Panax (*Tieghemopanax sambucifolius*).

20.0 PASS BURGESS ROAD ON LEFT.

20.9 Wonga vine (*Tecoma australis*) and tall tree ferns. If you are carrying Wakefield's *Ferns of Victoria and Australia* you may care to identify some.

21.2 REACH TRIANGLE ROAD. TURN LEFT.

21.9 Hairpin Banksia, Common Appleberry (*Billardiera scandens*).

22.6 T. JUNCTION. TAKE BUNYIP ROAD. RIGHT TURN.

23.5 TURN LEFT ALONG TYNONG ROAD.

From 24.1 to 24.2 Though now running through farming land and inhabited areas, it is pleasant to see an abundance of Rosy Heath-myrtle (*Baekea ramosissima*) with a good representation of Leafless Globe-pea, Silky Tea-tree and a Trailing Goodenia with very large leaves compared to the earlier specimens.

24.6 T JUNCTION. TURN RIGHT TOWARDS TYNONG.

At this corner a few patches of Blunt-leaf Heath.

25.8 At the right-hand side of the road a culvert is extended to become a rivulet, and leads to a small swamp—at least it could be a swamp in a wet season, and is worth a few minutes of study.

27.0 Mill Valley Ranch.

27.4 Cornucopia.

30.1 Princes Highway and End of Circuit.

Appreciations

My thanks to Mr. R. V. Smith of the National Herbarium for the identification of plants. Special thanks are given to Mr. and Mrs. B. Naylor who introduced me to the area, travelled around the circuit with me, and were greatly encouraging in all aspects of the work.

Information Wanted

If any reader has knowledge of the use of native plants by Aborigines for medicinal purposes, would they contact Mrs. J. McCarthy,—12 Sheffield St., South Caulfield 3162.

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Nature Notes from the Gold Coast

by ALEX. N. BURNS

During the past month the weather has been very hot; actually the hottest recorded on the coast since about 1883. Christmas Day recorded the highest temperature ever for the 25 December—37.2°C (99.1°F). Insect life has been fairly plentiful; butterflies, however, not in such abundance as is usually so at this time of year. Dragon flies (*Odonata*) are, and have been plentiful; with mainly species belonging to the Sub-order Anisoptera (true dragon flies). The pale blue-bodied species, *Orthetrum caledonicum* Br. is very abundant; also some of showy species of the sub-family Trameinae. Of these the yellow and black banded winged *Rhyothemis graphiptera* Sel. and the beautiful *R. chloe* Kby., a species with a large black and orange patch on each hind-wing, have not been uncommon. The flight of these insects is a graceful soaring, with occasional flapping wing movements.

Several fine species of Ant Lion Lacewings are at present on the wing, and most noteworthy is the large *Nymphes myrmeleonides* Leach.; an insect measuring three inches across the expanded wings which are transparent, with a narrow whitish centred brown oblong apical patch to each of the four wings.

The Common Orchard Swallow-tail butterfly (*Papilio aegeus aegeus* Don.) has been observed on various kinds of Citrus trees, the normal foodplant; together with several native trees and shrubs belonging to the Order Rutaceae. In addition to these the larvae have been recorded feeding on the garden shrub *Choisya ternata* (Mexi-

can orange). In the garden at Burleigh are some beds of giant African marigolds. Some of these were obviously showing foliage having been eaten, and this was soon tracked down to the presence of a number of almost fully grown larvae of this fine large butterfly. This record may constitute a new type of foodplant, and the marigold in question was "Sunset Giant".

The Swan plants and Buddleyias are nearing the close of their flowering season, and as a result the white spiders frequenting their inflorescences are becoming scarcer; then, too, some of the species of butterflies eaten by these spiders have gone until another brood appears. A few examples of the introduced Small Cabbage White (*Pieris rapae* L.) have fallen victims. At present the Common Crow (*Euploea core corinna* Macl.) is very plentiful, and specimens are very frequent visitors to the "spider" flowers. To date not one specimen has been attacked, perhaps due to the fact that these butterflies, being distasteful to birds, may also be so to the spiders.

Cicadas are extremely noisy and plentiful everywhere, the commonest species being the large Mottled Brown cicada (*Henicopsaltria eydouxii* Guer.). In the very early mornings the pre-adult nymphs may be seen emerging from the ground and crawling on to various objects to break open and allow the adults to emerge. Another very common species is the light brown medium sized *Tamasa tristigma* Germ. This cicada is very common from northern coastal N.S.W. right up to North Queensland.

At the Currumbin Bird Sanctuary

many of the Peahens have chicks; eggs are laid rather indiscriminately and in such places that they could not be incubated. Such eggs are collected and placed under Bantam hens and Muscovy ducks, both of which act as excellent foster mothers. The big lagoon is again well stocked with several species of wild duck, the daily maximum being about 400 specimens. The Ibis population is now between 40 and 50, and the Spoonbills, Herons, and other water birds are back in force.

The reptilian eggs mentioned in one

of my earlier notes have failed to hatch, probably due to having been disturbed. Although they were carefully replaced and the soil kept damp but not wet, all eggs shrivelled. From their size it would seem that they were laid by one of the larger Jew or Dragon type Lizards, several species of which are common in the area. Many examples of young Blue Tongued Lizards have appeared in the garden during the past couple of weeks; as many as five or six of these pretty little creatures being seen in a single morning or afternoon.

The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name

by JAMES A. BAINES

With the publication last year of *The Distribution of Victorian Plants*, by Dr. D. M. Churchill and Mrs. A. de Corona, and this year of the second volume of '*Handbook to Plants in Victoria*', by J. H. Willis, botanists and field naturalists in this State now have reliable and comprehensive references to up-to-date botanical nomenclature. This seems a good time to bring together from a number of sources the origins of these names, which are being increasingly used, to avoid confusion and ambiguity, in preference to the common or popular names.

Genera named after people will be dealt with in Part 1, and the remainder of the generic names represented in the flora of Victoria will be explained in Part 2. For convenience of reference they will be listed alphabetically, with an asterisk preceding introduced genera. If an asterisk does not appear before a genus with well-known introduced species, it indicates that there is at least one species native to Australia, sometimes a cosmopolitan species. Although a full bibliography of references used will be given at the end of the series, it should be stated that of special use have been Black's *Flora of South Australia*, Britten and Boulger's *British and Irish Botanists*, and the 1972 edition of *A Gardener's Dictionary of Plant Names*, by A. W. Smith and Dr. W. T. Stearn.

**Achillea*. Named by Linnaeus after the great Greek hero of the Trojan war, whose deeds were told by Homer in the *Iliad*.

**Adonis*. Named by L. after the legendary "beautiful youth", beloved of Aphrodite. The flower anemone was said to have sprung up on the spot where his blood fell. A special feature of later Adonis worship was the "Adonis garden", or bowers of plants in flower surrounding his

image to show the revival of plant life.

Adriana. Named by Gaudichaud, French botanist with Freycinet, after Adrien de Jussieu (1797-1853), member of the famous family from Lyons that produced five noted botanists: the brothers Antoine, Bernard and Joseph, their nephew Antoine-Laurent, and Adrien, son of the lastnamed.

**Albizia*. After Filippo del Albizzi, a Florentine nobleman who in 1749 introduced *A. julibrissin* into cultivation.

Amperea. Named by A. de Jussieu after Jean-Jacques-Antoine Ampère (1800-1864), a French historian after whose father, André-Marie, the ampere electrical unit of intensity of current is named.

**Amsinckia*. After Wilhelm Amsinck (1752-1831), burgomaster of Hamburg, who developed that city's botanical garden.

Anredera. Named by A. L. de Jussieu after Anreder.

**Avellinia*. After Giulio Avellino, a Neapolitan botanist.

Avicennia. Named by L. after Avicenna (the Latin form of Ibn Sina) (980-1037), a Perso-Arabian physician whose medical writings had much influence during and after the Middle Ages.

Babbagia. Named by F. Mueller after Benjamin Herschel Babbage (c. 1815-1878), son of Charles Babbage (inventor of calculating machine); president of Adelaide Philosophical Society. He led two exploring expeditions, collecting plants for Baron von Mueller.

Baeckea. Named by L. after Dr. Abraham Baeck (1713-1795), a Swedish naturalist and physician.

Banksia. Named by L.f. (Carl von Linné Jun.) after Sir Joseph Banks (1743-1820), with Cook on "Endeavour" voyage, President of the Royal Society, and great patron of science with a special interest in Australia.

Bartlingia. After F. G. Bartling (1798-1875), German botanist. (Now *Laxmannia*.)

**Bartsia*. After J. Bartsch (1709-1738). (Now *Parentucellia* and *Bellardia*.)

Bassia. Named by Allioni after Ferdinando Bassi (1710-1774), an Italian naturalist born in Bologna.

Bedfordia. Named by Augustin-Pyrame de Candolle after the Duke of Bedford.

**Bellardia*. After C. A. C. Bellardi, professor of botany, Turin University.

Bergia. Named by L. after Dr. Petter Jonas Bergius (1730-1790), Swedish physician and botanist, pupil of Linnaeus, professor of natural history and pharmacy at Stockholm Medical College. He established a botanical garden and herbarium, set up the Bergius Foundation, and published a flora of the Cape of Good Hope.

**Berkheya*. After Jan Le Francq van Berkhey (1729-1812), a Dutch botanist.

Bertya. Named by Planchon after Count Léonce de Lambertye, 19th century French botanist and horticulturalist, author of catalogue of Marne plants, 1847.

Beyeria. Named by Miquel after a Dutch cryptogamist named Beyer.

Bignonia. After Abbé Jean Paul Bignon (1662-1743), librarian to King Louis XIV. (*Pandorea pandorana* was formerly considered to be in *Bignonia*, then *Tecoma*.)

Billardiera. Named by Sir J. E. Smith after Jacques-Julien Houtton de La Billardière (1755-1834), French botanist, member of the d'Entrecasteaux exploring expedition — on his return to France in 1795 he had collected more than 4,000 plants. Those from Australia were described in his *Novae Holliandiae Plantarum Specimen*, published in 1804-1806. He travelled widely elsewhere.

(To be continued.)

Field Naturalists Club of Victoria

General Meeting — 12 February

Club President, Mr. Tom Sault, took the chair at the February meeting, which was well attended, particularly by younger members.

Miss Young reported the recent death of club member Mrs. Eta Betheras, as the result of a road accident, and a moment's silence was observed in her memory. The President congratulated Vice-President Mr. Leigh Winsor and Mrs. Winsor on the birth of their first child, a daughter.

The speaker for the evening was Mr. Dan McInnes, who gave "An Introduction to the Geology of Melbourne". Miss Madge Lester, organizer of the introductory talks series introduced the speaker. Mr. McInnes used a few well chosen slides and some charts and a map to illustrate a most carefully prepared and lucid explanation of the basic elements of Melbourne's geology.

The Secretary tabled a very long list of correspondence and drew attention to the most recent Land Conservation Council study area reports on the South East Region and North East Region, and the opportunity given for individuals and organizations to make recommendations to the L.C.C. for land use in the areas concerned.

It was also announced that the first General Meeting of the newly formed Victorian Field Naturalists' Clubs Association would be held in Shepparton over the March Labour Day week-end. A Club excursion has been arranged for the week-end and Miss Marie Allender is taking bookings for both the chartered bus and motel accommodation.

Mr. Roger Riordan reported that he had represented the Club at a second deputation to press for the preservation of the Terrible Hollow area near Mt. Howitt. The deputation to the Premier was organized by the "Save Our Bushlands Committee" and members felt that they had been sympathetically received. The main concern is that the wilderness nature of the area should be preserved by carefully controlled logging and closure of access tracks after this is finished.

The number of exhibits on display was smaller than usual and the President urged members to contribute whenever possible, as a good display table adds to the interest of the meeting.

Botany Group — 8 February

The first Botany Group meeting for the year was a Members' Night, and the first speaker, Mr. Alan Morrison, showed slides of some plants of the southern Australian coast, mostly taken at Bremer Bay and the Barren Ranges in Western Australia, and including several species indigenous to the Barren Ranges, some of which are still undescribed.

Mr. Ian Morrison showed a series of slides of flowers of the Victorian Little Desert. All of these had been seen in the field by club members during the camp in the spring of 1970.

Mr. Jim Baines gave reviews of three books about South Australian wildflowers:—"Kangaroo Island Wildflowers" by I. Jackson, published by Islander Newspaper, Kingscote; "Native Trees of South Australia", published by Woods and Forests Department, Adelaide; and "Wildflowers of South Australia", by Marion Beek with photographs by Dorothy Foster, published by Rigby.

Mr. Ian Cameron showed some slides of the Golden Plateau Mine and the country around it at Cracow on the edge of the Dawson River valley in Queensland.

After some discussion it was decided not to hold a group excursion in February. An excursion committee was formed to consider a programme for the remainder of the year, and it was agreed that the excursion day be changed to the last Sunday in the month. A report of the last excursion to Murindindi was given by Mr. Cameron, and a vote of thanks was passed to Mrs. Webb-Ware and her son who organized and guided the excursion.

At the next group meeting on Thursday, 8 March, Mr. Alan Morrison will speak on "Flowers of the Gulf Country".

The Day Group — 15 February

Twenty-five members met at the Kiosk in the Fitzroy Gardens for this, our first, outing for 1973, and all were pleased to find these gardens little affected by the drought and current water restrictions.

Members soon found interest in the "Fairy Tree", the fanciful work of sculptress Ola Kohn, and in the model Tudor Village presented by the citizens of Lambeth, England, in grateful recognition of the many food parcels sent from

Australia to England during the post-war food shortage. Next to be inspected were the children's adventure playground and the well-kept herbaceous borders of this area.

The monthly meeting followed, then lunch. The chairman reminded members of the recent threat to the eastern side of these gardens from a proposed free-way.

We next moved to the Conservatory via Captain Cook's Cottage. The pond beneath the statue of Diana attracted us with its aquatic plants, red, white and pink water lilies, Nardoo, Azolla, Myriophyllum and Nymphoides geminatum. Indoors the newly set up display of Tuberous Begonias held all with its great diversity and delicacy of colour.

The Fitzroy Gardens are mainly planted with exotics, but well-grown trees of Kauri, Bunya Bunya, Hoop Pine and Eucalyptus citriodora were noted and Scleranthus biflorus was found among the ground covers.

At 2.15 we began a guided inspection of Parliament House. The many questions asked proved that for most of us this was the highlight of the day's outing.

Panelling of Australian Red Cedar was admired and in the enclosed garden a fine specimen of Grevillea hilliana.

The following nominations have been received for election to Council:—

President

Mr. P. Kelly

Vice-Presidents (2)

Mr. L. Winsor

Mr. J. H. Willis

Secretary

Mr. R. H. Riordan

Asst. Secretary

Mrs. M. Corrick

Editor

Mr. G. Ward

Asst. Editor

Mr. G. Douglas

Librarian

Mr. J. Martindale

Asst. Librarian

Miss G. Piper

Excursion Secretary

Miss M. Allender

Residual (5)

Mr. M. Coulthard

Mr. D. M. Barham

Dr. B. Smith

Mr. I. Cameron

Mr. R. Gibson

REPORT BY COUNCIL

The members of the Council submit herewith balance sheet as at 31 December, 1972, and income and expenditure account for the year ended on that date, and report as follows —

1. The Net Surplus of the Club for the year ended 31 December, 1972, was \$5, which added to the Surplus brought forward at 1 January, 1972, of \$7,918, together with a transfer of \$367 from Club Improvement Account, results in a surplus to be carried forward to next year amounting to \$8,290.
2. The members of the Council took reasonable steps to ascertain before the profit and loss account and balance sheet were made out, that all known bad debts were written off and adequate provision was made for doubtful debts.
3. The members of the Council took reasonable steps, before the profit and loss account and balance sheet were made out, to ascertain that the current assets, other than debtors, were shown in the accounting records of the company at a value equal to or below the value that

would be expected to be realised in the ordinary course of business.

4. At the date of this report, the members of the Council are not aware of any circumstances which would render the values attributable to the current assets in the accounts misleading.
5. No charge on the assets has arisen, since the end of the financial year to the date of this report, to secure the liabilities of another person. No contingent liability has arisen since the end of the financial year to the date of this report.
6. No contingent or other liability has become enforceable or is likely to become enforceable within the period of twelve months after the end of the financial year which in the opinion of the members of the Council will or may affect the ability of the club to meet its obligations as and when they fall due.
7. At the date of this report the members of the Council are not aware of any circumstances not otherwise dealt with in the report or accounts which would render any amount stated in the accounts misleading.

8. The results of the club's operations during the financial year, in the opinion of the members of the Council, were not affected by any item transaction or event of a material and unusual nature.
9. Since 31 December, 1972, and to the date of this report, in the opinion of the members of the Council, no item transaction or event of a material and unusual nature, which would affect substantially the results of the club's operations for the next succeeding financial year, has occurred.
10. No member of the Council, since the end of the previous financial year, has received or became entitled to receive a benefit by reason of a contract made by the club with the member or with a firm of which he is a member or with a company in which he has a substantial financial interest.
11. The names of the members of the Council in office at the date of this report are as follows—
President—T. Sault.
Vice-Presidents—L. Winsor.
J. H. Willis.
Secretary—R. H. Riordan.
Asst. Secretary—Mrs. M. Corrick.
Treasurer—H. Bishop.
Asst. Treasurer—D. Kelly.
Excursion Secretary—Miss M. Allender.
Editor—G. Ward.
Asst. Editor—G. Douglas.
Librarian—J. Martindale.
Asst. Librarian—Miss G. Piper.
Residual—M. Coulthard.
D. M. Barham.
Dr. B. Smith.
I. Cameron.
On behalf of the Council—
R. H. RIORDAN.
H. BISHOP.

Field Naturalists Club of Victoria

We, ROGER H. S. RIORDAN and HENRY H. BISHOP, being two members of Council of the Field Naturalists Club of Victoria, do hereby state that in our opinion —

- (b) the accompanying balance sheet is drawn up so as to give a true and fair view of the state of affairs of the company as at 31 December, 1972.

By Resolution of Council—

Members of Council.

I, HENRY H. BISHOP, being the officer in charge of the preparation of the accompanying accounts of the Field Naturalists Club of Victoria for the year ended 31 December, 1972, state that, to the best of my knowledge and belief, such accounts give a true and fair view of the matters required by Section 162 of the Companies Act, 1961, as amended, to be dealt with in the accounts.

H. H. BISHOP, Treasurer.

The Secretary,
Field Naturalists Club of Victoria,
MELBOURNE.

Pursuant to Section 166A (1) of the Companies Act 1961 as amended of Victoria, I, HENRY HAYDN BISHOP, being a member of The Field Naturalists Club of Victoria, hereby nominate the firm of Danby, Bland & Co., for appointment as auditors of that Company at the next annual general meeting.

H. H. BISHOP, Member of Council.

Year 1971	Liabilities	
	Current Liabilities—	
397	Subscriptions paid in advance ..	\$583
332	Sundry Creditors ..	—
—	Treasury Grant—Victorian ..	500
	<i>Naturalist</i> —in hand ..	4
72	M. A. Ingram Trust Grant, in hand ..	\$1,087
	Special Funds and Accounts —	
3,101	Building Fund ..	3,273
5,311	Publication Fund ..	6,036
100	Library Fund ..	100
923	Club Improvement Account ..	573
200	Excursion Account ..	200
5,217	Estate M. Wright Legacy ..	5,217
418	Estate Ruby A. Lewis Legacy ..	—
200	Estate Miss I. F. Knox Legacy ..	200
500	Estate C. M. Walker Legacy ..	1,000
20	Estate R. S. Chisholm ..	20
514	Wilfred C. Woollard Fund ..	551
608	Microscope Project A/c. ..	613
2,419	Flower Book Account ..	2,666
—	Trailer Account ..	13
	Surplus of Assets over Liabilities—	20,462
	Balance at 1/1/72 ..	7,918
	Transfer from Club Improvement Account ..	367
	Surplus for year ..	5
7,918		8,290
\$28,250		\$29,839

We report that in our opinion the accompanying Balance Sheet and Accounts of the Field Naturalists Club of Victoria are properly drawn up in accordance with the provisions of the Companies Act 1961 and so as to give a true and fair view of the state of the Club's affairs at 31st December, 1972, and of its operations for the year ended on that date, and that the accounting and other records examined by us have been properly kept in accordance with the provisions of the Act.

Melbourne.

2nd February, 1973.

Signed:
Danby, Bland & Co.,
Chartered Accountants,
Auditors.

Year 1971	Assets	
	Current Assets —	
1,861	Cash at Bank ..	1,852
2,000	Commonwealth Bonds, at cost ..	2,000
1,406	Sundry Debtors ..	910
	Stocks on hand at cost —	
17	Badges ..	49
134	Microscope Project ..	72
577	Books for Sale ..	575
338	Flower Books ..	—
	Fixed Assets at cost —	\$5,458
5,314	Library Furniture and Equipment ..	5,681
141	Land — Costick Reserve, Maryborough ..	141
	Investment of Funds —	5,822
100	Library Fund — Commonwealth Bonds, at cost ..	100
5,200	Legacy Estate M. Wright — Commonwealth Bonds, at cost ..	5,200
—	Legacy C. M. Walker — Commonwealth Bonds, at cost ..	1,000
500	Wilfred C. Woollard Fund — M.M.B.W. Debuture, at cost ..	500
2,250	Flower Book Account — Commonwealth Bonds, at cost ..	2,450
	Building Fund —	9,250
2,100	Commonwealth Bonds, at cost ..	2,100
1,000	S.E.C. Inscribed Stock, at cost ..	1,000
1	Cash at Bank ..	173
	Publications Fund —	3,273
1,800	Commonwealth Bonds, at cost ..	1,800
	Book Stocks, at cost —	
1	Victorian Ferns ..	—
559	Victorian Toadstools ..	468
312	Wyperfield National Park ..	251
129	Wilson's Promontory Nat. Park ..	136
1,360	Sundry Debtors ..	1,311
1,150	Cash at Bank ..	2,070
		6,036
		\$29,839

FIELD NATURALISTS CLUB OF VICTORIA

BUILDING FUND

Amount of Fund at 31st December, 1971	\$3,101
Interest on Investment and Bank Account	172
Amount of Fund at 31st December, 1972	<u>\$3,273</u>

PUBLICATIONS FUND

Amount of Fund at 31st December, 1972	\$5,312
Interest on Investment and Bank Account	128
Transfer of R. A. Lewis Legacy	418
Surplus for the year from —	
Ferns of Victoria	—
Victorian Toadstools and Mushrooms	35
Vegetation of Wyperfeld National Park	42
Wild Flowers of Wilson's Promontory National Park	50
Birds of the Dandenongs	51
	<u>178</u>
Amount of Fund at 31st December, 1972	<u>\$6,036</u>

CLUB IMPROVEMENT ACCOUNT

Amount of Account at 31st December, 1971	\$923
Sale of Old Library Books and Cupboard	15
Booksales Account Profit	2
	<u>\$940</u>
Less — Purchase of Library Books, Furniture and Equipment, transferred to Surplus Account	\$367
Amount of Fund at 31st December, 1972	<u>\$573</u>



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Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

Key Office-Bearers, 1972-1973.

President:

Mr. T. SAULT

Hon. Secretary: Mr. R. H. RIORDAN, 15 Regent St., East Brighton, 3187. 92 8579

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Hon. Editor: Mr. G. M. WARD, 54 St. James Road, Heidelberg 3084.

Hon. Librarian: Mr. P. KELLY, c/o National Herbarium. The Domain, South Yarra 3141.

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Geology: Mr. T. SAULT.

Mammal Survey: Mr. D. KELLY, 107 St. Elmo Road, Ivanhoe, Vic. 3079 (49 4583).

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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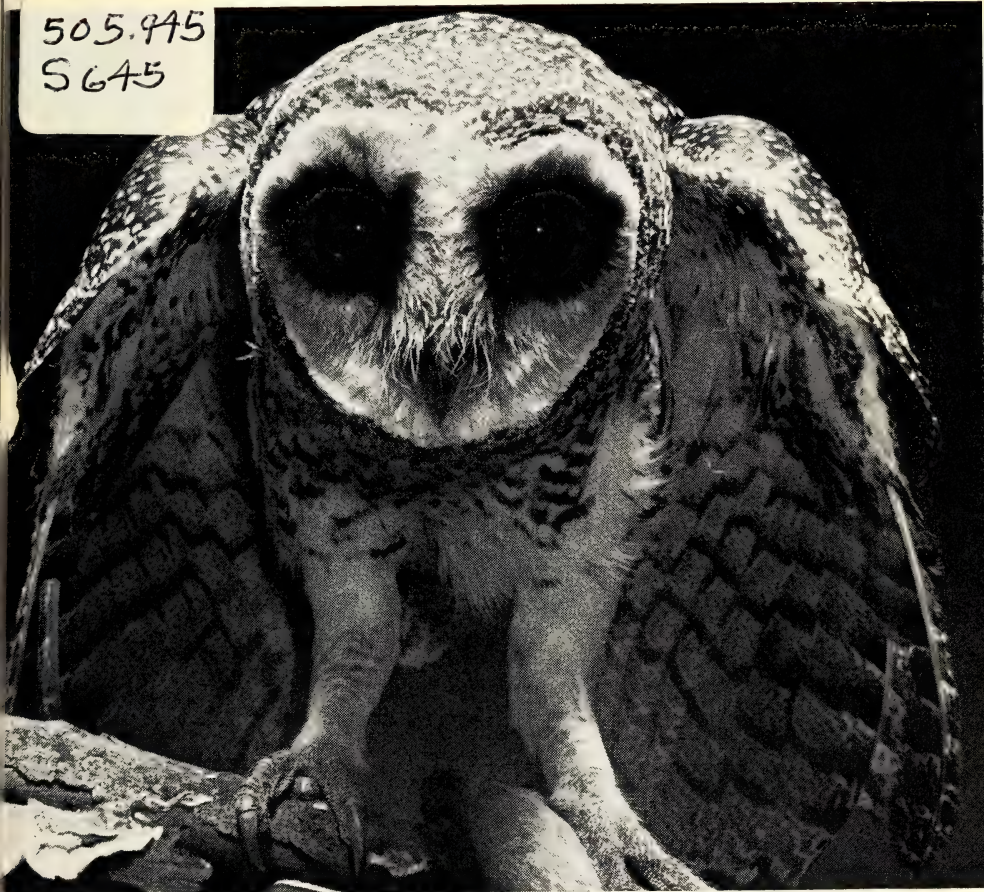


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APRIL, 1973

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 9 April — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — "Aboriginal Antiquities of Victoria": Mr. Aldo Massola.

New Members:

Ordinary:

Miss Laurette Hall, Flat 2, 12 Stanley St., Brighton 3186.
Miss Noni Holmes, 12 Victoria St., Canterbury 3126. *Mammals*.
Miss Chris Hartshorne, 31 Bishop St., Box Hill 3128. *Botany*.
Mr. Andrew Mitchell, 8 Burwood Ave., Ringwood 3134. *Botany, Geology, Marine*.
Mr. Stephen Morton, Dept. of Zoology, University of Melbourne, Parkville 3052.
Mrs. Marian Rubio, Dept. of Zoology, University of Melbourne, Parkville 3052.
Miss Elizabeth Turnbull, 3/589A Toorak Rd., Toorak 3142. *Flora and Fauna*.
Mr. Barry J. Fitt, 1/1 Yarmouth St., Ringwood, 3134. *Mammals*.

Joint:

Mr. John Rutherford, Mrs. Angela Rutherford, Zoology Dept., University of Melbourne, Parkville 3052.
Mr. John Murphy, Mrs. Margaret Murphy, 585 Rathdowne St., North Carlton 3054.

Monday, 14 May — To be announced.

GROUP MEETINGS

(8 p.m. at National Herbarium unless stated otherwise.)

Thursday, 12 April — Botany Group Meeting. "Some Impressions of New Zealand Flora": Miss L. White and Mr. I. F. Morrison.

Day Group — No meeting will be held in April.

Wednesday, 18 April — Microscopical Group meeting.

Thursday, 26 April — F.S.G. General Meeting at 8.00 p.m. in Conference Room, National Museum.

Wednesday, 2 May — Geology Group meeting.

Monday, 7 May — Marine Biology and Entomology Group meeting at 8.00 p.m. in Conference Room, National Museum.

Thursday, 10 May — Botany Group meeting.

CAMPS

Easter: 20-25 April — Sunset Country.

JUNIOR F.N.C. MEETINGS

Friday, 13 April — Inaugural meeting of Black Rock Junior F.N.C. at 8.00 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

Friday 27 April — Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 4 May — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 11 May — Montmorency and District in Scout Hall, Petrie Park at 8.00 p.m.

F.N.C.V. EXCURSIONS

Sunday, 15 April — This excursion follows the talk on "The Geology of Melbourne" by Mr. D. McInnes at the February general meeting and will be led by Mr. McInnes. The coach will leave Batman Avenue at 9.30 a.m., fare \$1.50. Bring a picnic lunch.

Easter: Friday, 20 April-Anzac Day, Wednesday, 25 April. Harrierville with day excursions to nearby areas. Accommodation on a dinner, bed and breakfast basis has been booked at Bon Accord Hospice. Cost for accommodation and coach is \$48.00 and this should be paid to the excursion secretary by the April meeting. The coach will leave from Flinders Street, near Gas and Fuel Corporation at 8.45 a.m. on Good Friday — bring a picnic lunch. Lunches for other day trips may be obtained from the Hospice if required.

Sunday, 29 April — Excursion to Kinglake, transport by private car, final arrangements at April meeting or telephone Secretary.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

Vol. 90, No. 4

4 April, 1973

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Front Cover:

The Sooty Owl (*Tyto tenebricosa*) was taken as a nestling and kept in captivity. It was photographed by Graham Pizzey near the Atherton tablelands, northeast Queensland.

April, 1973

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Kookaburras in Literature and Design

by

ELLEN M. MCCULLOCH*

In many ways not immediately apparent our Australian animals and flowers have become part of our accepted cultural background, whether we realize it or not. Scientific interest and curiosity were aroused as soon as the first Australian botanical and zoological specimens were collected and examined. It may not always be realized how long ago there was also some degree of popular appreciation of the wonderful forms and colours found in the Australian countryside.

Professor R. M. Crawford in "Australia" (Hutchinson's University Library 1952) commenting on pastoral society about the middle of the nineteenth century writes —

"The useful that he had studied hitherto had been a native Australian product; the ornamental was imported European tradition. The result of their blending was something not quite European. There were nostalgic importations of all sorts, English or Scottish styles of domestic architecture, English trees and flowers, the rabbit and the fox for the huntsman . . . Nevertheless, the life of the station, even when the pioneering days were over, had taken on a recognizably Australian Character. The European house was surrounded by wide Australian verandahs. Its approach was as likely to be through an avenue of gum-trees as through an avenue of imported pines or poplars."

As early as 1842 the fashionable and ornate Sir Joseph Banks Hotel at Botany used an Australian theme. "The stained glass throughout the house has Australian birds and butterflies to recall the devotion of Sir Joseph Banks" — Sir Paul McGuire 1952 "Inns of Australia" (Wm. Heine-

mann Ltd.). Early hotel names included *The Kangaroo* in 1831, *The Emu* in 1838 and *The Black Swan* in 1844.

I do not presume to be knowledgeable enough about Australian Aboriginal myths and legends to include more than a passing reference to their diverse imagery embodying so many birds and animals. It would be of great interest to see a comprehensive collection of such legends gathered together, so that comparison could be made with bird folklore from other parts of the world. Edward Armstrong in "The Folklore of Birds" (Collins 1958) includes only one or two of these references to Australian bird species.

Apart from the foretelling of bad weather by the appearance of Swifts (*Apus* sp.) or Black Cockatoos (*Calyptrorhynchus* sp.), we seem to have few examples of accepted home-grown folklore about Australian birds. One given on p. 103 of P. A. Bourke's "Elementary Bird Study" (Paterson Brokensha Pty. Ltd. 1955) states that if a Kookaburra perches on a tree in the yard and laughs the only way to break the spell of accompanying bad luck is to smash a bottle. (At times one cannot help wondering just how many Australians have heard of and taken advantage of this one.)

The rhyme for counting birds still chanted by schoolchildren which begins "One for sorrow, two for joy", is not peculiarly Australian, but is found

*6 Bullen Avenue
Mitcham, Victoria 3132

with variations in many countries. It is usually applied here to magpies.

One bird well-known and thought of as typically Australian is the Laughing Kookaburra, *Dacelo gigas*. It is today amiably regarded by even those members of the public who are not particularly aware of birds. In "An Index of Australian Bird Names" published by the C.S.I.R.O. in 1969 there are 25 common names listed from past and present literature, in addition to the accepted vernacular Laughing Kookaburra, and this is a good indication of the widespread popularity of the species.

Additionally, in "Bird Wonders in

Australia" (Angus & Robertson 1958) A. H. Chisholm lists on p.226, 44 terms used by tribes of Aborigines, most of the names beginning with the guttural K or G. Yet another alternative, Goburra, is included in the 1889 publication "Australian Furs and Feathers" by Mary Anne Fitz-gerald (Edwards Dunlop & Co. Ltd.). In this latter book we also have the early white settlers' term "Settlers' Clock", referring to the rousing early morning chorus, calculated to waken anyone within earshot.

It is interesting to compare this with the charming Aboriginal legend referred to by various writers including



Plate 1

Crest of No. 1 Bomber Squadron,
R.A.A.F.

April, 1973



Crest of City of Bowral, N.S.W.



Stained-glass window.

Photo — J. Hyett.

A. W. Reed in "Aboriginal Fables and Legendary Tales" (A. H. & A. W. Reed 1965). This tells us that the sky spirits, after renewing light and warmth every day on earth with their fires, were disappointed to find the animals continuing to sleep after light flooded the world. They hung the bright morning star as a sign that fire would soon be kindled, but still the lazy animals slept on. So they came down to find the Laughing Jackass calling, and bargained with him that they would light the fires every morning for the new day if he would laugh loudly enough every morning to wake the sleeping workers.

We read of some of the early Europeans referring to the Kookaburra's song as "a hideous chorus of fiendish laughter", but it was evidently not long before colonists became used to this unique and conspicuous sound.

By 1880 cast-iron designs incorporated various Australian wildflowers and birds, and in his book "Sydney Lace" (Georgian House 1962) E. Graeme Robertson illustrates one rather improbable cast-iron kookaburra with spread wings, as well as many other charming designs.

I have seen several leadlight windows of a later date with a kookaburra set in the centre of a small circular design, and there are probably more elaborate examples in existence. One cannot help wondering if there is an Australian counterpart to the European and South Africa cathedral windows portraying the theme of St. Francis of Assisi. I have been unable to trace anything much about stained glass windows in Australia.

The decorative carving on Emu (*Dromaius novaehollandiae*) eggs varies from very sophisticated cameos to rough but effective heavy shapes, and kookaburras feature in some of these. Some have a delicate appearance, resulting from partial removal

of various layers of shell to provide pale tones, and one such cameo I have seen portrays a detailed scene of an emu walking about below a branch on which a kookaburra is sitting.

The illustrations in Kurt Albrecht's "Nineteenth Century Australian Gold and Silversmiths" (Hutchinson Group (Aust.) Pty. Ltd. 1969) show the variety of styles of silver-mounted emu eggs prevalent in the late nineteenth century. Kookaburras are included in the natural history motifs in similar elaborate presentation pieces which no doubt delighted their recipients.

Some of our stamps have illustrated this species, and I have two different 6d. browns and a 3d. blue. I have slides of carved and painted wooden models, and at the turn of the century when it was the fashion to paint nearly anything on black cloth for cushion covers, kookaburras were included. They are now stamped on teatowels and suppercloths, and painted with more gusto than taste on countless tourist souvenirs.

About the turn of the century Australian motifs were carved on furniture by both professional and amateur woodcarvers and the best of this work was very well designed and executed. Most items were fashioned realistically and are identifiable down to species level. Eucalypts, waratahs and acacias were plants often used, and kangaroos, emus, swans and kookaburras figured frequently in the choice of animals.

I have found a number of churches in Victoria graced with carved pews, and there are undoubtedly many more here and in other States worth exploring from this point of view. The carvings on the end of the pews in the Anglican Church of St. John the Evangelist in Toorak, Victoria, were executed by Mr. J. E. Lonegan in 1933-34, and a kookaburra is included. In the Methodist chapel at the "Orana" Children's Home at Bur-

wood, Victoria, opened in 1958, the kookaburra is included twice in the carved pew-ends, executed by Mr. W. Langcake.

Surrounds on some of the honour boards commemorating 1914-1918 war memorial names include kookaburras, though the less elaborate ones I have seen are mainly decorated with entwined leaves of eucalypt and wattle.

The official silver badge of the War Widows' Guild of Victoria is an attractively designed kookaburra, set on an oval shape.

In "A Roll of Australian Arms" (Rigby 1971) Charles Low illustrates many Australian birds included in registered coats-of-arms, and kookaburras are supporters of the corporate coat-of-arms of the City of Bowral in New South Wales. (I must add that my favourite in the book is the Sydney Hospital's Sea-Eagle perched on a rum barrel.) Not included in this book are the heraldic crests of many sections of our armed forces, some of which include birds. The accompanying illustration shows a kookaburra on the crest of the First Bomber Squadron of the R.A.A.F. Note also the encircling stylised wattle blossom and leaves.

In addition to correctly registered arms many schools, city halls, shire offices and other bodies produce a similar badge or symbolic emblem. The 1960 crest of the City of Ringwood in Victoria, includes a kookaburra with a spray of wattle, and a gum-tree.

Additionally, there are a number of kookaburra trade-marks, and one I have not yet seen is the early gas stove named appropriately enough if with rather laboured humour, a "Kooka". I understand that the cricket balls used in Test matches are Kookaburra brand, but I have not been able to obtain any information about them.

Perhaps someone will be able to supply details.

At one time 20th Century Fox Films began all their Australian newsreels with a quivering chorus of kookaburras, beaks open and tails shaking.

In the century-old "The Young Australians' Alphabet" published in Melbourne in 1871 (La Trobe Library copy) the kookaburra is featured under J not K —

"J is for Jackass

A very strange bird,

Whose laugh in the forest

Is very absurd."

Some of the moral verses have a quaint ring today, for example, "N for New Zealand I'm sorry to say, The settlers are driving the Moaries away". Nevertheless, it was neither the English countryside nor its nightingales and robins that were employed to encourage young readers: the white cockatoo, emu, eastern rosella, kookaburra and wattle (and the Yarra) are all uniquely Australian.

The name Jackass is still sometimes used, although it is not clear how it arose. The Grey Butcherbird, *Cracticus torquatus*, was occasionally called the Darling or Derwent Jackass and is the bird referred to by the early Australian poet, C. H. Souter, in "Irish Lords", his nostalgic poem which lingers in the memory —

"The rime was on the barley grass

as we passed the homestead rails,

A Darling jackass piped us in with
his trills and turns and scales,"

The Laughing Kookaburra was introduced into Western Australia about 1897, and a children's book, "The Story of Kurri Kurri the Kookaburra", by Leslie Rees (John Sands Pty. Ltd. n.d. 1950) tells the story of this introduction.

I have seen a seven-page paper, "The Kookaburra — Dinkum Oil Edition", published at the First Divisional Base Depot at Tel-el-Kebir,

27/7/1916. In the circumstances the roughly drawn Kookaburra on the cover possibly roused more nostalgic comment than criticism.

In 1918, Norman Lindsay's, "The Magic Pudding" (Angus & Robertson Ltd.) appeared, and the "low larrikin Kookaburra" with hands in pockets and hat on head will always be affectionately remembered. The natural dark stripe through the eye of the bird is cleverly used to emphasize a lowering brow, and is accented by the large beak. You may recall that it was a rule of life for Bill Barnacle "never to fight people with beaks".

In 1931 a book, "Hail, the Kookaburra", was printed by Pratten Bros. Ltd. of Sydney. This contained two stories, the first from which the book was named by A. H. Chisholm, and the other, "Laughing Jack", by Dorothea Drewett. Plates of paintings by several artists, including Neville Cayley, illustrated this.

In 1933 Brooke Nicholls wrote "Jacko the Broadcasting Kookaburra" (Angus & Robertson Ltd., Sydney) and no doubt Jacko's personality and ability to laugh on request made him a most popular figure. It was in 1934 that the "Tales of Snugglepot and Cuddlepie" by May Gibbs (Angus & Robertson Ltd.) began to delight small children, and it was wise old Mr. Kookaburra who warned the Nuts against Humans ". . . as bad as bad, but there must be bad things in this world as well as good."

It was also in the early 1930s that a children's session on the Australian Broadcasting Commission was opened by a Miss Kookaburra, possibly a Mrs. Hatherly who very successfully imitated a kookaburra's laugh at the beginning and ending of the programme. Another personality in the same programme was Bobbie Blue-gum (Mr. Frank Hatherley). These broadcasts possibly pre-dated the

A.B.C., for there are no records of them there, and any more information would be welcome.

Strangely enough, considering the way early popular writing so often represented kookaburras killing snakes and thereby being "good", snakes were seldom included with kookaburras in representations. Perhaps the problem of artistically arranging a dangling snake was just too much to organize.

I have vague childhood memories of constructing a bird with snake from pine-cones but (perhaps fortunately) cannot remember the result.

Kookaburras and magpies are probably the species most frequently included as typically Australian birds in verse and song, and children at primary school are still taught the round which begins "Kookaburra sits on the old gum-tree, Merry merry king of the bush is he". In suburban schools these days there are many children who have never seen or heard a kookaburra in the bush, and certainly there are fewer in suburban areas.

Virginia Parry's interesting book, "Kookaburras" (Lansdowne Press Pty. Ltd. 1970) is the first written about aspects of the species' breeding biology, though there are many relevant references in popular articles and scientific papers over the years.

I have not attempted an overall coverage of the literature, but have simply drawn attention to some of the references I have found interesting.

Changing economic and political conditions as well as isolated eccentricities have been responsible over the years for many individual designs utilising Australian natural history subjects.

Federation in 1900 and the fluctuating nationalistic fervour which for years preceded it, plus participation in two world wars are amongst events which caused many Australians to

realize the worth of things Australian, including its plants, flowers, birds and other animals. It is quite clear that the recent quickening of interest in all aspects of our wildlife has its roots set down well over a century ago, which is a comforting thought to one irritated by the repeated remark that "conservation" will soon feel the swing of the pendulum against it, as enthusiasm wanes.

Thankfully, it is no longer compulsory for our overseas trade fair representatives to wear "digger" hats, kangaroo-skin skirts and wreaths of artificial wattle blossom to prove that they are Australian. Inevitably concepts have changed with the times, and the best modern designs incorporating animals and flowers have an authority which satisfies the eye as does any article well-designed and executed. Examples can be found in many fields, including tapestry, pottery, glass, jewellery, trade-marks, cards, embroidery and wall-hangings; they may be large or small, a unique piece such as the Mategot tapestry in the National Library at Canberra, or the millions of decimal coins in common usage.

I have given examples of the popular acceptance of the Kookaburra simply to show how long ago this kind of interest was aroused. Another

animal, or flower could just as easily have been chosen and many spring to mind.

I realize that I have barely touched the surface of what is in existence, and I would be most grateful if readers would contact me regarding examples of designs known to them. Many items will be known only to their owners, and descriptions, sketches or photographs would be invaluable. Some early destructible items such as plaster cornices on buildings, china, carved emu eggs, screens and glass have already disappeared without trace. Tracing this aspect of our history produces all kinds of fascinating sidelights, and is time well spent.

ACKNOWLEDGEMENTS

Authority to reproduce the crest of the No. 1 Squadron was given by the Secretary of the Department of Air, Commonwealth of Australia. "The Young Australian's Alphabet" was viewed at the La Trobe Library, State Library of Victoria.

I would like to thank Mrs. Nancye Kent Perry for bringing several books quoted to my notice, and Mr. A. R. McEvey and Mrs. Lea for providing information about early broadcast programmes. My thanks go to Mr. Jack Hyett for patiently photographing many items on my behalf.

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The Occurrence of Gum-topped Stringybarks in the Trentham Forest

by

D. H. ASHTON* AND G. WILLIAMS†

Within the last four years two interesting gum-topped trees have been discovered in the Messmate-Peppermint-Grey gum forests of the Trentham district.

The first tree was found in 1968 not far from a tributary of Coopers Creek (grid ref. 281817 on the Daylesford map 827) by Mr. I. T. Sartori. It is 105 feet high, 26 inches diameter at breast height (d.b.h.) and occurs in an even aged, wet, tall open-forest of the dry sclerophyll type. The associated trees are *E. obliqua*, *E. radiata* and *E. cypellocarpa* and the undergrowth consists chiefly of open shrubs of *Acacia mucronata* and *Goodenia ovata* with a floor of *Tetrarrhena juncea* and Bracken. The creek 100 yards away, is vegetated by *E. viminalis* and a dense understorey of Musk (*Olearia argophylla*) tree ferns and ground ferns. The gully vegetation is thus typical wet sclerophyll forest. The gum-topped specimen was clothed with typical stringy-bark up to the main branches at about 70-80 ft. The fruits were intermediate in size between *E. obliqua* and *E. regnans*, and possessed a slightly more open "wine-glass" shape than the former and the decidedly flattened rim of the latter (Fig. 1). The shape and venation of the leaves were similar to *E. regnans* but the odour of the leaf oils was strong and similar to that of *E. obliqua*.

The second tree was found in 1971 on Babbingtons Hill (grid. ref. 304.888 on the Daylesford map 827) 4½ miles north of the first tree, by Mr. I. T. Sartori and Mr. N. J. Evans. It is 124 feet

high and 24 inches d.b.h. and occurs in a similar type of forest to the first tree. It has a rather sub-fibrous persistent bark below the main crown. Its leaves are broader than those of tree 1 and they have both the shape and oil odour of those of *E. obliqua*. Its fruits are wine-glass shaped with descending rims and sunken valves and are thus identical with typical fruits of *E. obliqua* (Fig. 1). The characters of the two gum-barked trees therefore suggest that they are of hybrid origin. The putative parent species appear to be *E. obliqua* and either *E. regnans* or perhaps *E. radiata*.

Hybrids between *E. obliqua* and *E. regnans* are relatively common in Victoria and Tasmania (Ashton 1958) but hybrids between *E. obliqua* and *E. radiata* are very rare and appear to occur only in areas where *E. obliqua* is already hybridizing with other stringy-barks (Gill and Ashton, in press).

About ten progeny of each of the two Trentham trees were raised in the glasshouse and leaves of the fifth node were examined for their oil gland size and density. In Figure 2 these results were superimposed on the background of previous work (Fig. 2) (Ashton 1958). It can be seen that the recombination of these characteristics encompasses the whole range between the progeny of typical trees of the putative parent species. In addition, the progeny of both the Trentham trees possessed oil odours ranging

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from that of *E. obliqua* to that of *E. regnans*. Likewise lignotuber development ranged from large to none at all. None of the seedlings showed any trace of *E. radiata* characteristics—in either leaf shape, colour, arrangement or oil odour. In addition *E. radiata* seedlings readily produce large lignotubers, hence any hybrids between this species and *E. obliqua* would not be free of this organ.

These studies therefore strengthen the conviction that the two isolated trees at Trentham are hybrids between *E. obliqua* and *E. regnans*. Hybrids between these two species are commonly found where they occur in mixed stands (or where their forest types meet) and resemble the two Trentham trees.

The Trentham area has been well searched and no known records of *E. regnans* occurrence exist. It is possible that this species could have been present last century and failed to regenerate following decimation of the forest by the early mining industry and by repetitive fires.

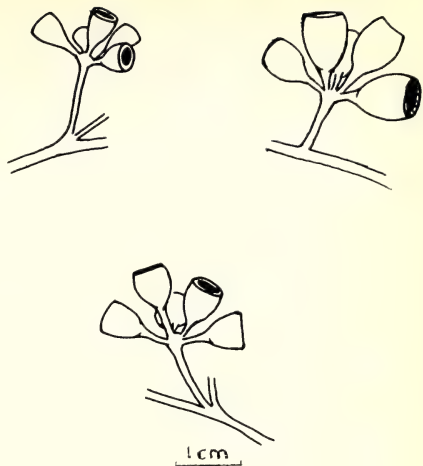


Figure 1

Mature Fruits

<i>E. regnans</i> Kinglake	<i>E. obliqua</i> Daylesford
Hybrid Trentham	

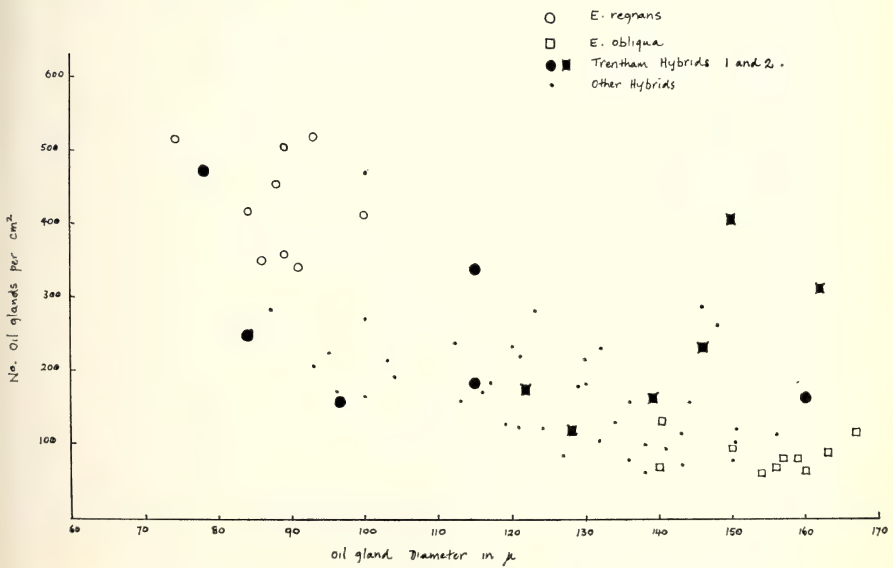


Figure 2

If *E. regnans* has not occurred in the district in the historical past then the presence of the two hybrid trees is interesting. The nearest occurrence of *E. regnans* to the Trentham hybrids is a limited stand at Stony Creek, Mt. Macedon, 16-18 miles to the east. The nearest major occurrence of *E. regnans* is at Mt. Disappointment, a further 30 miles to the east. The problem of the hybrid distribution so far from one of the putative parent species could be explained by chance pollination by birds such as honeyeaters in a year when both species were flowering simultaneously, or by chance dispersal of hybrid seed. However, another possibility is that *E. regnans* genes may be present in the *E. obliqua* population in the Trentham district, but rarely recombined to produce a visible phenotype. If such were the case it could indicate that *E. regnans* had occurred in the area in some past wetter period. At the present time, the rainfall is 43 inches per annum, a value decidedly marginal for the natural occurrence of *E. regnans* in Central Victoria. It is thus probably

too dry for *E. regnans*, but wet enough to enable some of the hybrid swarm to persist. Pryor (1952, 1962) has pointed out that if one parent species of a hybrid swarm is eliminated its prior occurrence can sometimes be inferred by the greater variability of the population or the existence of "phantom" characteristics within it. As yet we do not know the relative state of variability of the *E. obliqua* population at Trentham. The problem perhaps highlights the need for conservation of eucalypt forests in as many areas and habitats as possible so that the biology and history of these complex species can be fully understood.

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- Pryor, L. D. (1953). A compound *Eucalyptus* hybrid. *Proc. Linn. Soc. N.S.W.*, **IXXVII**: 361-363.
- Pryor, L. D. (1962). The validity of Taxonomic categories in the assessment of evolutionary trends within the genus *Eucalyptus*, p. 466-456, in *The Evolution of Living Organisms*, Ed. G. W. Leeper, M.U.P.

Footnote:

Since the submission of this paper, Mr. Sartori has found a third gum-topped stringybark, 99 feet high and 20 inches D.B.H., east of Mt. Wilson (Daylesford map grid ref. 3120805), and a fourth similar but larger tree some two miles away. Specimens of the third tree have been examined and show '*E. regnans*-type' leaves, a mild *E. obliqua* oil odour and typical *E. obliqua* butt bark. The fruits are like *E. obliqua*, but many taper to the pedicel. It is a presumed hybrid although no progeny have yet been raised.

The occurrence of at least four probable hybrids trees scattered across the Trentham district suggests that they are indicative of either a phantom distribution of *E. regnans* in the past or a prelude to its appearance in the future. Such hybrid trees could in fact be a genetical invasion of *E. regnans* into *E. obliqua* by means of long distance bird pollination. Regardless of their origin there is an intriguing possibility that *E. regnans* may eventually 'materialize from the gene-pool' by a progressive selection in the event of a wetter climatic regime.

Set of "Victorian Naturalists"

Following the recent offer of a set of "Naturalists", requests were received from the Libraries of C.S.I.R.O. (Division of Wildlife Research), La Trobe University, Native Plants Preservation Society, and the Gould League. Would any member who has a set of "Naturalists" of some duration which they would be prepared to give to one of these Libraries, please contact the Secretary.

Four Principles of Conservation

by

EDMUND D. GILL*

The Premier of an Australian State received numerous letters concerning conservation. Being willing to do something about it, he sent the letters to the Secretary of the Crown Law Department, asking him to sort out the issues. The Secretary carefully studied the letters, then had to report that the letters more or less cancelled each other out! Those interested in conservation speak with many voices, so that sometimes the result is Babel. The reason is that public enthusiasm has rushed ahead of scientific study. The blunt fact is that we do not know enough about conservation. It involves the delicate interdigitation of the animals, plants and environment that make up an ecosystem. They all depend on one another. No animal or plant can be treated in isolation. We need to know more about natural history.

Too often conservation is identified with some single local issue, whereas we need rather to have clear principles which we can apply to any conservation problem. Such have not yet been adequately defined. They urgently demand our attention. From my own reading and thinking I have set down four principles that seem to me to be important. At least they can serve as a stimulus to thought.

1. Conservation is "*a principle of civilization*". Science has provided man with such powerful tools that he could destroy himself and/or his environment in a very short space of time. Civilization is learning to exercise understanding and purpose so as to conserve "the greatest good for the

greatest number for the longest time". There is an economic aspect of conservation that is very obvious. Unless we conserve enough water we will desiccate; unless we conserve the soil, the dry land will become a rock mass incapable of supporting the millions of men. But there are even more important aspects of conservation, e.g.

(a) *To conserve the life of the earth.* Once a species becomes extinct it can never be brought back. Man has been wholly or partially responsible for the loss of hundreds of species of living things.

This impoverishment of the fauna and flora is both a scientific and cultural loss. Even races of men, such as the Tasmanians, have been lost for ever. Given long enough, bare rocks will break down to soil, but lost species can never be regenerated.

(b) *To conserve the natural beauty of the earth.* So much of the earth's surface has been cleared for cultivation or housing or other purposes that the natural areas are rapidly shrinking. Under the pressures of the population explosion, we are in danger of losing the natural world.

2. *Conservation is an ecologic concept.* The present ecosystems are complexes that have resulted from a long evolution. They vary in their stability. Conservation is the process by which we maintain the present stability, or pass from one stability to another. Thus to seek to conserve one factor in the environment (such as the soil) or one form of life (such as the kangaroo) is unwise and can be disas-

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trous. All the factors of the balanced ecology must be considered. Conservation is the science and art of living successfully in one's environment.

3. *Conservation has universal application* therefore. Whether the ecology be natural bush, the national park, the farm, the suburban reserve, or the backyard garden, the principles of conservation apply. Environmental continuity ensures human continuity, and makes progress possible.

4. *Conservation is a prerequisite of utilization.* The maintenance of the natural world in a physical and biologic balance does not exclude utilization. Harvest is the excess of plant and animal populations. Conservation not only provides for present needs

but also for those of future generations. It should therefore be the concern of everyone. Good conservation is not just conservation for survival but the achievement of a better environment through wise management based on scientific understanding.

Knowledge of ecology makes conservation in the natural world possible. It is a new science and we have much to learn. But as this subject is so central to the necessities of conservation, should it not be taught more widely (Gill 1972)?

REFERENCE

Gill, E. D., 1972. The facts of life. *Palaeogeogr. Palaeoclimatol., palaeoecol.* 11: 235-236.

Nature Notes from the Gold Coast

by ALEX. N. BURNS

Over the past month much further activity has been observed on the butterfly-catching spiders. These predators appear to occupy any type of flower which is likely to attract insects. A pink flowering *Spathoglottis* orchid has been flowering progressively for several weeks, and on one particular morning a fairly large Hover fly (*Diptera-syrphidae*) was observed apparently settled on one flower in the raceme. At the moment this did not seem unusual, but an hour later the fly was still in the same position on the flower, and closer examination revealed the presence of a rather small example of the "white" spider which had caught and killed the fly. Normally these orchids do not attract insects, much less so, spiders.

The Buddleyia bushes have been favouring the garden with a second flowering, probably brought about by the rain storms of a few weeks ago.

As usual, many butterflies visit these flowers and the activities of the "white" spiders have been renewed in earnest, and added to the earlier list is a specimen of the Australian Leafwing butterfly (*Doleschallia bisaltide australis* Feld.). This is a large strong flying Nymphalid with a wing expanse of approximately two and three-quarter inches. The spider that captured this specimen had a body the size of a pea. Each day several observations have been carried out, and repeats of the captured butterflies listed in the February *Naturalist*, have been frequent.

Very consistent species visiting the flowers, and remaining on them whilst imbibing nectar for long periods, are the Common Crow (*Euploea core corinna* Macl.), Lesser Wanderer (*Danaus chrysippus petilia* Stoll.), Blue Tiger (*Danaus hamata hamata* Macl.), and the Glasswing (*Acraea*

andromacha andromacha Fab.). All these butterflies are recorded as being distasteful to birds, so a close watch was kept to see if any specimen was attacked by the spiders. Normally a spider will lurk for some days in the same flower raceme. Several of these were noted, and from time to time specimens of the so-called distasteful butterflies visited them. Not on any occasion was an attack made by a spider; in fact the hiding spider hardly moved. This again seems to indicate that these butterflies are free from attack for the reason indicated in the February *Naturalist* notes. The writer would be much interested to hear from any observer having seen any of the above species of butterflies being attacked by spiders.

A very large Orb Web Spider was seen in its web, and in which was caught a specimen of the Blue Tiger. A watch was kept for about an hour, and the spider although moving about in its web, did not attempt to attack the struggling butterfly. Apparently the spider was not interested, and after an hour the butterfly was released unharmed. Later the same day several small moths were caught in the web and these were very soon dealt with.

Recently, in the evenings and early mornings, odd specimens of *Glomeridae* (*Myriapoda-Glomeridae*) have been observed on paths and walls. These peculiar creatures are shining

black and hard, and if disturbed or touched, immediately curl up into a ball and remain so often for long periods of time. Normally they occur under rotting logs and amongst stones, and excepting at night, are seldom seen running about. I have not much information relative to these creatures, so it is quite possible that their classification may now be altered.

The big lagoon at Currumbin Bird Sanctuary is again teeming with bird life, the wild duck population would be over 400; the Ibis between 40 and 50 (varying from day to day); and other miscellaneous birds in the region of 100. From time to time accidents and fatalities unfortunately occur to young birds, mainly ducks, whilst swimming on the lagoon which is inhabited by a number of large black and voracious eels. One of the three-quarter grown black cygnets had a foot badly and permanently injured by one of these creatures. They appear quite unafraid and will come to the water's edge and take full slices of bread from human hands. Some of the eels are three feet in length and correspondingly thick.

As I write, and for the past 24 hours, heavy rain is the picture, and some seven inches have so far been recorded. This may mean the commencement of the real "wet season", and in any case will cause a big increase in insect life in the very near future.

F.N.C.V. CAR STICKERS

F.N.C.V. Car Stickers are now available from Mrs. Strong, Book Sales Officer, at a cost of 25c each.

Car owners travelling in the country or interstate can identify other members quickly in this way.

It also helps to advertise the Club.

A New *Corybas* Species from Victoria and N.S.W.

by DAVID L. JONES

CORYBAS HISPIDUS D. L. Jones spec. nov.

ex affinitate C. fimbriati (R.Br.) Reichenb. f. a quo praecipue differt: sepalis dorsali quam labello longiore atque angustiore; labello manifeste hispido, eius marginibus incurvatis; umbone labelli emarginato; petalis lateralibus ad basin late alatis; columna alata, in parte antica dimidia contracta; anthera obtusa.

HOLOTYPE: Mt. Hamilton, N.E. Victoria, $\pm 5\frac{1}{2}$ miles north-north-east from Wulgulmerang Post Office—D. L. Jones & K. C. Rogers, 20 March 1972 (Mel). **ISOTYPES** at Mel, NSW, K.

PARATYPE: MacPharlanes Flat Track near junction with Ingeegoodbee Track—D. L. Jones & K. C. Rogers, 1 April 1972 (Mel, NSW, K.).

ALSO EXAMINED:—

1. Near Ingeegoodbee River at MacPharlanes Flat Track crossing—K. C. Rogers, 28 May 1969, *Herb.* K. C. Rogers.
2. Bridle Creek, north of the Ballantyne Hills—A. C. Beaglehole, 25 Aug. 1970 ACB n. 33318; and again 20 March 1971, A. C. Beaglehole, K. C. Rogers and D. L. Jones.
3. Mount Hamilton, Snowy River road, $\pm 5\frac{1}{2}$ miles north-north-east of Wulgulmerang Post Office—B. E. Jones, D. L. Jones, A. C. Beaglehole, K. C. Rogers, 20 March 1971; and again 31 March 1972—D. L. Jones and K. C. Rogers (**HOLOTYPE**).

4. The Bluff, Bonang-Gelantipy Road — A. C. Beaglehole, K. C. Rogers, E. R. Rotherham, 10 April 1971 ACB n. 37865.
5. Summit of Mt. Coricudgy, ± 26 miles East of Rylstone, N.S.W.—R. Lowe, 26 March 1967 *Herb.* C. K. Ingram.
6. Upper Botobolar, N.E. of Mudgee, N.S.W.—R. Lowe, 14 April 1969 *Herb.* C. K. Ingram.
7. Headwaters of Back Creek, Carabost State Forest, N.S.W.—A. E. Logan, 17 April 1971. On a steep Granite slope under *Eucalyptus macrorrhyncha*.

Leaf 15-35 mm. in diameter, cordate to orbicular, green on both sides. *Flower* 18-25 mm. long, reddish-purple, dominated by the lamina of the labellum, sessile or almost so. *Ovary* about 6 mm. long, narrow, subtended by a small narrow bract. *Dorsal sepal* 20-25 x 10-12 mm. when flattened out, greenish-grey spotted with dark purple, cucullate, concave, broadly spathulate, obtuse, much contracted in the proximal one third. *Petals* about 6 x 0.5 mm. slightly falcate, forming broad wings at the base where they join the column, then tapering to filiform points. *Lateral sepals* about 6 x 0.8 mm., deflexed, tapered from base to extremity; apex \pm bifid. *Labellum* longer than the dorsal sepal; labellum-tube 5-7 mm. long much shorter than the lamina, erect for about 5 mm. then abruptly decurved through about 180° and greatly expanded into a broadly ovate or deltoid lamina; lamina 16-22 mm. long reddish-purple with a conspicu-

ous white central boss, its margins deeply fringed with purple fimbriae up to 5 mm. long; boss dome-like, conspicuously hispid, notched in the upper $\frac{3}{4}$, the minute teeth especially obvious on the margins of the notch. *Auricles* small, directed obliquely upward, the opening 1.2-1.4 mm. in diameter. *Column* about 3 mm. long, dilated anteriorly in the proximal half, prominently winged. *Stigma* \pm 2 mm. in diameter, \pm reniform, concave. *Anther* \pm 9 mm. long, entire. *Pollinarium* 1.4 x 1.0 mm. long, consisting of 4 pollinia in two pairs attached directly to a reniform viscidium 0.7 mm. long.

Flowering Period:—March-May.

Distribution:—At present known from north-eastern Victoria in high-land areas and south-western and central-western N.S.W., extending as far north as Botobolar near Mudgee. An extension of range is to be anticipated due to previous confusion with *C. fimbriatus* (R.Br.) Reinchenb. f.

Discussion:—The distinctiveness of this orchid was first recognized by the author in 1971 following a field trip to the Wulgulmerang area of North-eastern Victoria. Further field trips by the author and collections by Beauglehole and Rogers have shown that it is a fairly widespread and often locally abundant species in the mountains around Wulgulmerang. Specimens from Carabost in southern N.S.W. collected by Logan proved to be identical with the Victorian material. Subsequent checking by the author of specimens in the Herbarium of Ingram showed that the species is also to be found in the Central West of N.S.W. Further extensions of its range are to be anticipated and it is possible that the species will be recorded in Tasmania. From records so far checked it appears that *C. hispidus* is an inland species while *C. fimbriatus* is coastal. Willis lists a

dubious inland record of *Corybas fimbriatus* from the Ovens River in Victoria. The author has examined these specimens microscopically and found them to be the widespread *C. diemenicus* (Lindl) H. M. R. Rupp & W. H. Nicholls ex H. M. R. Rupp.

It seems obvious that collectors have confused *C. hispidus* and *C. fimbriatus*, as superficially both have many similarities. Comparative differences are listed in Table 1. The new species can be readily recognized by the markedly hispid labellum with the mounded boss conspicuous, white and notched. A further difference easy to pick out is the peaked appearance of the dorsal sepal. This organ in *C. fimbriatus* is shorter than the labellum and as broad. Microscopically the columns and lateral petals of both species exhibit further differences.

Corybas hispidus is the first member of the genus to flower in Victoria. In seasons of good summer rains the



Plate 1
Corybas hispidus.

Photo — E. R. Rotherham.

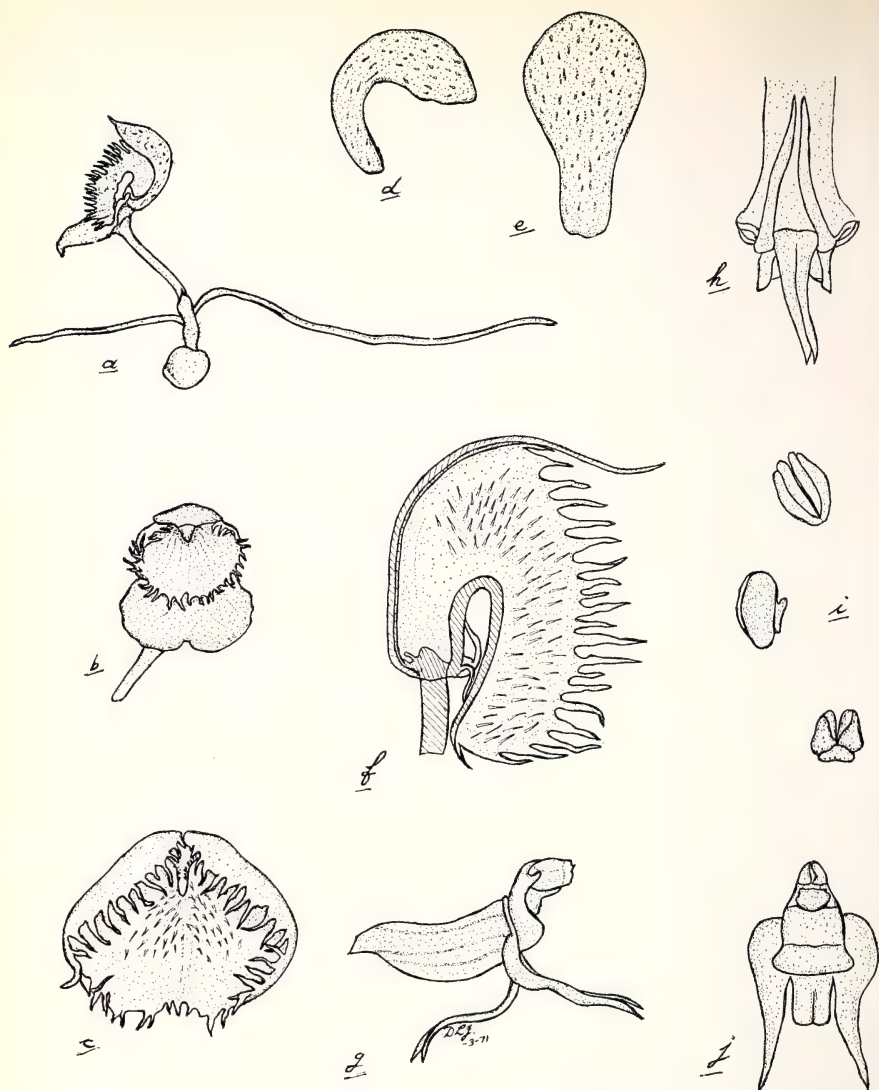


Figure 1

- | | | | |
|--|----|---|-----|
| (a) Flowering plant from side | 1X | (g) Column, lateral sepals and lateral petals from side | 5X |
| (b) Flowering plant from front | 1X | (h) Base of labellum tube showing auricles, lateral sepals and lateral petals, from front | 5X |
| (c) Labellum from front | 2X | (i) Pollinarium | 10X |
| (d) Dorsal sepal from side | 2X | (j) Column, lateral sepals and lateral petals from front | 5X |
| (e) Dorsal sepal flattened out | 2X | | |
| (f) Longitudinal section of flower . . | 3X | | |

species is in full bloom by late March and is usually well finished by May when *C. fimbriatus* is just starting on the coast.

Acknowledgements

The author wishes to acknowledge

the kind hospitality and cheerful help given by K. C. Rogers of Wulgulmerang. I am also indebted to J. H. Willis for the Latin description and E. R. Rotherham for the accompanying photograph.

TABLE 1
(Contrasting Characters)

C. fimbriatus

Dorsal sepal as broad as but shorter than labellum, not extending out beyond it.

Labellum smooth or shortly scabrous on surface, the central mounded boss entire. Lateral petals narrow at the base.

Column not winged, dilated laterally in the distal half.

Anther pointed.

C. hispidus

Dorsal sepal long, much narrower than labellum and extending out beyond it.

Labellum conspicuously hispid on surface, the central mounded boss notched. Lateral petals broadly winged at base. Column winged, narrowed laterally in the distal half.

Anther blunt.

The Grampians Excursion

27 August – 2 September 1972

A party of 17 members left Melbourne for Stawell at 9 a.m. on 27 August. A lunch break was spent on a wayside stop east of Ararat, where rambling plants of *Hardenbergia* were most conspicuous. Later, on a walk parallel with the Western Highway, in heath-land type of vegetation, *Correa reflexa* was found in varying shades from crimson to pink. *Grevillea alpina* also showed variations in the colour of its flowers. On the outskirts of Stawell we stopped to investigate the Native Plant Preservation Society of Victoria Sanctuary, – on C.R.B. land beside the highway.

Acacia pycnantha in full blossom scented the air, as it was the dominant wattle. Flame Heaths were conspicuous, and also colonies of *Drosera whittakeri*, *Pterostylis nana* and *P. longifolia*. It was most noticeable that within the rabbit-proof fence, the

plants showed more prolific growth, as compared with the stunted and sparse growth outside the Sanctuary. For the next six days we were to see many species of wattles, and the beauty of the bush at this time of the year was lit up by their profusion of blossom.

The London Motel, Stawell, was our headquarters for the six nights of the week. The Stawell Field Naturalist Club arranged our itinerary, and a member of their club joined our party as guide for each day.

Monday, 28 August. We should like to thank Miss Jean Hughes for being leader for the day. In the paddocks on the left-hand side of the Stawell-Hall's Gap Road we saw flocks of emus sharing the pasture with sheep. On the Bolte Highway, in the foothills of the Mount Difficult Range, we met Miss Jean Galbraith and her

party. In chosen places of heathland our botanising was greatly helped by Miss Galbraith imparting her knowledge.

Here it was interesting to find growing side by side, three species of *Leucopogon* — *L. glacialis* (twisted leaves), *L. ericaides* (long sprays of scented flowers), *L. virgatus* (common (near Melbourne)); two species of *Spyridium*, *S. vexilliferum* (twiggy), *S. parvifolium* (a western form with small woolly leaves), two *Persoonia*, *P. juniperina*, and *P. confertiflora*; four *Hibbertias* — *H. virgata*, *H. sericea*, *H. fasciculata*, *H. linearis*; several species of *Epacris* indigenous to the area; two *Hakea* — *H. sericea* (with lumpy fruits), *H. rostrata* (with beaked fruits); two species of *Bankisia* — *B. ornata*, *B. marginata*; and several species of *Acacia*. *Thryptomene* was at its zenith of perfection, and in massed growth along this road.

Some of our members walked to the Freestone Quarry, famous for the building blocks used in the 1880's for the front of Parliament House, the G.P.O. and Harbor Trust Buildings in Melbourne. Lunchtime was spent on the Roses Gap Road, and in the afternoon some of us climbed Mount Zero.

At night we attended the Stawell F.N.C. monthly meeting, when Mr. Ian Morrison of the F.N.C.V., gave an interesting narration on his excellent Kodachrome record of a safari around north-west Australia.

Tuesday, 29 August. We thank Mr. Neil Bennett for his leadership on the excursion to the foothills of the Pyrenees, via Bulgana, Joel, Concongella, Salt Creek, Landsborough, Crowlands, and Warrewang. Our objective was to see a Slate Mine, from which roofing tiles were obtained for Parliament House, Melbourne. From low grade slates, we found large crystals of

iron pyrites. There were stages showing oxidation of iron pyrites to iron oxide, and its subsequent dissolving by rainwater making the slate porous. Among the many birds recognised, the Black-tailed Native Hens made a special impression.

Wednesday, 30 August. Miss Hughes drove four of us to the Ironbark Forest at 7 a.m., especially to hear and record on tape, the song of the Crested Bell-bird. In the afternoon Mrs. Neil Bennett and her daughter, Margaret, joined us for a visit to the Grampians, the Wonderland walk, Sundial Track area, and Bellfield Lake. At night we attended a lecture in Hall's Gap, on the "Natural History of the Grampians", given by Mr. Ian McCann, the president of the Stawell F.N.C.

Thursday, 31 August. Mr. Neil Bennett pointed out the important landmarks of Stawell as we drove on our way to the Three Jacks Reserve, and the two-acre, fenced-in Sanctuary for Native Plants. There were particularly fine specimens of the shrub, *Hybanthus floribundus*. *Diurus pedunculata* was numerous. Then we roamed in the open forested area of the Ironbark Ranges, and visited the lonely grave of a boy with 1854 date on the headstone. In the Glenorchy district, at Deep Head, at the home of Mrs. K. Bennett, a barbecue lunch was prepared for us. We should like to thank Mrs. Bennett for her kind hospitality, and the members of the Stawell F.N.C. who prepared this meal, and afternoon tea. Mr. Neil Bennett took us for an exploratory walk over the nearby gold diggings, where we found double-pointed hexagonal crystals of Quartz. Both *Cala-denia caerulea*, and *Micromyrtus ciliatus* were growing in abundance in the gravelly soil.

Friday, 1 September. Miss Hughes guided us, via Fyan's Lake Reserve, Pomonal, Hall's Gap, to Fyan's Creek and Stawell Water Reservoir. We walked up the Barbican Rocks Road and investigated the disused water flume. After lunch at the Burroughs Huts site, we drove to Jimmy's Creek area. Here we found fine specimens of *Epacris impressa*, *Grevillea oleoides*, and, nearby, *Sprengelia incarnata*. Before returning to Stawell, we visited Mrs. Johnson's Native Plant Nursery at Hall's Gap.

Saturday, 2 September. Members of the Stawell F.N.C. came to farewell us at 8.45 a.m. We should like to thank them for all they did to make our visit a memorable one. A stop at McDonald Park, west of Ararat, was rewarding with very fine specimens of *Correa reflexa*, and a pink variety of *Hakea sericea*. Lake Windermere, Ballarat, proved the next pleasant respite for watching many interesting waterbirds, and a fitting place for our last stop on such a successful Spring Excursion.

MARY K. DOERY.

***Geoplana atrata* Steel, 1897 – A new Planarian record for Victoria**

by LEIGH WINSOR*

Recent night surveying along the Plenty River, Lower Plenty as part of a study of Victorian land planarians (Phylum-Platyhelminthes), resulted in the collection of several species of flatworm.

One of these species was later identified as *Geoplana atrata* Steel, previously only recorded in New South Wales. This therefore constitutes a new record of the species for Victoria.

***Geoplana atrata* Steel, 1897**

Steel, T., 1897. *Proc. Linn. Soc. N.S.W.* 22: 104-119.

The ground colour of the planarian was an intense shiny black without any dorsolateral markings. On the ventral surface a dark grey median line 0.3 mm. wide bordered by pale grey lines of the same width, extended

*Field Survey Group, F.N.C.V.
8/4 Rathmines Street, Fairfield 3078.

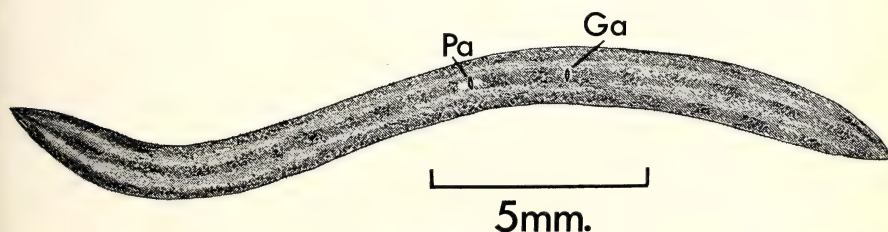


Figure 1.

Ventral surface of *Geoplana atrata*. Pa pharyngeal aperture. Ga genital aperture.

the length of the worm. The black ground colour 0.3 mm. wide along the margins of the ventral surface, was continuous with the dorsolateral surface. The ventral median line appeared mottled under X20 magnification. A single row of large eyes extended laterally along the entire length of the animal. They were difficult to distinguish from the black ground colour along the sides, but were readily observed at the anterior end. The dimensions of the worm when crawling were 20 mm. long and 1 mm. wide. The pharyngeal aperture was 11 mm. behind the anterior end. The genital aperture was 2 mm. behind the pharyngeal aperture. Both apertures were situated on the ventral surface (see figure).

The above description agreed in every respect with that of Steel, and the position of the genital aperture determined. This had not previously been noted. Diagnostic features of *G. atrata* are the jet black colour of the dorsal surface (*atrata* — clothed in black), and the ventral median dark grey stripe as shown in the figure. It is considered an uncommon species of land planarian.

Two specimens of *G. atrata* were collected from the banks of the Plenty River by the bridge on the Lower Plenty Road, Lower Plenty, Victoria. One of those specimens was lodged with the National Museum of Victoria as a voucher specimen (N.M.V. Reg. No. G2111). Its dimen-

sions were 20 mm. long and 1 mm. wide when crawling, and 17 mm. long, 1 mm. wide following fixation. Morphology and colour were little changed by the formalin based preservative, and the diagnostic ventral stripes remained distinct.

The animal was found on moist clay under cover of grass and other herbage bordering the river bank. It preferred a sheltered habitat, in contrast to the other planarians with which it was associated. When disturbed it took cover in mudcracks or between grass stems, moving with a rapid leech-like motion. The animal was extremely delicate, readily fragmenting when handled. Its mucus secretion was very sticky and adhered to dry surfaces. Associated with *G. atrata* were *G. munda* which was very common, and *G. ventrolineata* seen less commonly. *Rhynchodemus simulans* which closely resembles *G. atrata* was also found at one locality. Other specimens of *G. atrata* were found along the banks of the Yarra River, Fitzsimmons Lane Templestowe, and Deep Creek, Romsey. Its occurrence was localized at each of the localities.

ACKNOWLEDGEMENT

I should like to thank Dr. Brian Smith, Curator of Invertebrates, National Museum of Victoria, for his advice.

REFERENCE

Steel, T., 1897. Australian Land Planarians: Descriptions of new species and notes on collecting and preserving. *Proc. Linn. Soc. N.S.W.* 22: 104-119.

Notice to Country Clubs

It is proposed that the names and addresses of the Presidents and Secretaries of all F.N.C.'s should appear in the *Victorian Naturalist*. It would therefore be appreciated if these could be lodged with the F.N.C.V. Secretary when convenient.

Vale, Norman Arthur Wakefield

by

J. H. WILLIS

The stunning news of Norman Wakefield's sudden, untimely death, through a fall at his Sherbrooke home in the Dandenongs on 23 September, 1972, reached me in Amsterdam a few days later. It seemed unreal that such an active fellow naturalist and brilliant research scientist was no longer with us. Only recently he had been enthusiastically planning special accommodation on his newly acquired property where naturalist friends could come and enjoy the quiet silvan setting, so close to Sherbrooke Forest with its wealth of trees, ferns, fungi and varied animal life.

Since returning to Australia, I have been gratified to read the touching tribute by our editor, Grif. Ward (*Vict. Nat.* 89: 285, Oct. 1972), and to note that the Council of the Field Naturalists' Club has decided to perpetuate Wakefield's memory by establishing a fund for some worthy objective—one hopes that donations will roll in, and also that an early effort will be made to publish a bibliography of all his writings. After Wakefield was awarded the Australian Natural History Medallion for 1962, I had the honour of contributing a brief account of his exploits and activities for publication in the *Victorian Naturalist* (see Vol. 81: 193-194, Nov. 1964). It is now appropriate to update this record.

Throughout his long association with this Club (from election to membership in May, 1938), N. A. Wakefield published no less than 126 articles and notes in its journal, many of them

well illustrated by his own good photographs or line drawings. His first paper was botanical, "Further notes on orchids of the Orbost District" (*V.N.* 55: 129, Nov. 1938) — an addendum to the paper on Orbost orchid occurrences by Frank Robbins (Oct. 1938); at that time Wakefield had tallied 66 species of Orchidaceae for Orbost and its environs. His final paper, 33½ years later, was historical and ornithological, about "Harmony Vale, Baron von Hügel and an early Victorian bird collection" (*V.N.* 89: 156-164, June 1972). When perusing his numerous writings one is impressed by the wide versatility of interest and talent — from the finer cranial measurements of a rare marsupial to evidence for pin-pointing the pioneer alpine journey of John Lhotsky from the Monaro almost to Mt. Kosciusko in March 1834. He crowded more into his 53 years than most of us would do if granted several lifetimes.

Up to April 1957 he had published the descriptions of 39 new species of Australian plants, and about this time he aided the writer very materially in preparing draft-keys to several large and difficult sections of the native flora, to be embodied later in the *Handbook to Plants in Victoria*, Vol. I (1962) and Vol. II (1973). As editor of the Club's journal for 11½ years from November 1952 (except for one year, April 1957-May 1958, when Mr. A. B. Court handled the editorship), he brought the *Victorian Naturalist* to a high standard of presentation, attractiveness and popularity.

In 1967 Longmans brought out the book, *Naturalist's Diary*, which was a classified selection of Norman Wakefield's nature articles that had appeared each week in the *Melbourne Age* between 1963 and 1965. There was a splendid review of it by young school-teacher Evan Rowlands (now, alas, also deceased) in *Vic. Nat.* 85: 138-139, May 1968. By far the majority of subjects were presented in an East Gippsland context, which reflected the author's particular knowledge and enthusiasm for this part of the State. As a member of the Royal Society of Victoria for about eight years, he contributed a few well documented papers to the *Proceedings* of that body, the last one entitled "Palaeoecology of fossil mammal assemblages from some Australian caves" (Vol. 85: pp. 1-26 with three plates, June 1972). The Royal Society's symposium on East Gippsland, published early in 1969, included a significant historical paper by Wakefield, complementing his "Genesis of Gippsland" that had appeared in *The Educational Magazine* 8, Nos. 7 and 8 (August and September 1951).

In 1969 Monash University conferred upon him the Master of Science degree for his thesis, "An investigation of later Pleistocene and recent cave deposits in south-eastern Australia". Probably the most exciting and spectacular discovery of all was made just a year before he died. With F.N. club member Keith Rogers (of Wulgulmerang) and Russell Bat-hard (science student of Monash Teachers' College) he was botanizing along a cliffy section of the Genoa River near the N.S.W. border, when he saw a trail of unmistakable fossil footprints in the Devonian sandstone (about 350 million years old)! There were several tracks exposed on the extensive slab of rock, indicating a Palaeozoic amphibian between 2 and

3 ft. long. Wakefield lost no time in sharing his find with Professor J. W. Warren (Zoology Department, Monash University) who recognized its world-wide interest — the footprints may prove to be the oldest yet known to science. The location of this discovery was not made public until specimens of the tracks had been removed to safety by helicopter early last August, when there were several simultaneous announcements in the press. A preliminary note has been published in *Nature*, under the joint authorship of Warren and Wakefield who were also collaborating in a major research programme on the footprints.

Whatever N. A. Wakefield's academic attainments, and these were certainly numerous, he will also be sadly missed for his personal qualities — gentle, cheerful, helpful, open-hearted, honourable, meticulous and tidy, courageous, tenacious of purpose, inspiring confidence, the loyal and stalwart companion of many. Perhaps I may be forgiven for indulging in a few personal reminiscences, since it is my own privilege to look back upon 33 years of friendship with Norman. When our children were young, he would entertain them by the hour with jokes, tricks and sleights-of-hand, and his visits to the home were always more than welcome.

During the 1940's and early 50's, when he was teaching at Genoa and Cann River schools, we enjoyed many a camp-out in such remote parts of Gippsland as Suggan Buggan, Mt. Ellery, Bendoc Hills and the Howe Ranges. On long week-ends, he would meet my Friday bus, from the Bairnsdale rail-head, at Orbost about 6 p.m. with the cheery greeting: "All aboard; we start straight away and do our driving through the night, then we can use every bit of tomorrow's daylight for exploring." What hectic week-

ends those were! — we'd both be dog-tired by the Monday. But it was such fun sharing in his latest botanical discoveries, and together turning up an occasional new record. One day, en route for Suggan Buggan, he met me in Orbest with a hoodless car and, upon being quizzed, remarked laughingly, "Oh, I tore it off last week — rammed into some logs that projected too far behind a timber jinker." While we chugged up the long slope from Buchan to W. Tree, the sky grew dark and threatening, but Norman tried to console my increasing apprehension and sense of exposure to chilling winds: "This pine country of the Upper Snowy is quite dry really; I've never struck rain there at this time of year." It wasn't long before the heavens opened up, and we were sitting soaked and miserable in pools of water as we crept along through Gelantipy and Wulgulmerang to a dismally wet camp — however, we dried out next morning in bright sunshine. By contrast, another trip in Genoa district was made unpleasant by sweltering mid-summer heat. The night was so hot that we simply stretched out to sleep on the flat granite rocks along Genoa Creek, an idyllic spot where boulders were festooned with streaked Rock-orchids; we awoke in the early dawn to find an enormous black snake coiled up between us on the same slab.

On the occasion (Dec. 1951) of our joint excursion to Mt. Ellery, the approach along a narrow forest road was

effectively blocked by a huge dead and recently fallen tree. My pessimistic reaction was to abandon the car and walk the remaining eight miles to the foot of Ellery. "Not on your life," said Norman, "we *aren't* going to do a stretch of 16 miles when we can probably burn the jolly thing through in a few hours." So we sat up all night stoking a mighty bonfire under the centre of that log; by daylight, there remained only a small unburnt arc on the top and this was soon severed by some axe-work, the hardest job being to lever the two smouldering ends off the track so that our car would pass through. At length, reaching the vast jumble of granite boulders (some as big as houses) at 4,200 ft., we climbed barefoot to the top of the gigantic summit rock (Aborigines knew Ellery as *goonegerah* or "egg mountain", after its crowning monolith). There we paused to drink in the absolutely magnificent panorama unfolding in all directions, and photographed each other as a record — my profile is discernible in the plate on p. 35 of *Naturalist's Diary*.

So one could multiply the adventures we shared along the track, cherished the more in memory now that he is gone. I have yet to meet a stronger or more resourceful bushman than Wakefield in his prime, and he was a "white" man to the core. I warmly endorse the sympathy extended editorially by Mr. G. M. Ward to his widow, Audrey, his elderly surviving parents and other relatives.

BLACK ROCK JUNIOR F.N.C.

Members of the Hawthorn Junior F.N.C. are helping to launch this new club, on Friday, 13 April, at the Congregational Church Hall on the corner of Arkaringa Crescent and Bent Parade.

The guest speaker for the evening will be well-known naturalist, Mr. Jack Hyett, who will give an "Illustrated Nature Talk".

Information from Mrs. Hampton,
98 7064.

The Field Naturalists Club of Victoria

ANNUAL REPORT 1972-73

Council feels that 1972 has seen a significant improvement in the affairs of the Club, though a number of serious problems remain. On the bright side, we have nominations for all positions on Council, though one member has since had to resign, and there is a much greater public awareness of, and interest in, the need to conserve our natural resources. The Field Survey Group and Day Group have had a successful first year, and the preparation of the Cumulative Index to the Victorian Naturalist is progressing steadily. Volumes 1-88 have been indexed, giving 12,000 cards which are now being checked in preparation for publication.

The Australian Natural History Medalion for 1972 was awarded to Allan Strom of Sydney, noted for his prominent role in ecological education and his active participation in many societies.

The proposals to form a Union of Field Naturalists' Clubs have culminated in the formation of the Victorian Field Naturalists' Clubs Association which will hold an Annual Convention of all Clubs.

On the other hand, the burden of running the Club still falls far too heavily on a few willing workers, most of the members remaining uninvolved, and our membership figures do not reflect the upsurge of interest in conservation. In February, the Mammal Survey Group split, most of the former Committee leaving to form a new group. A number of members elected to continue the F.N.C.V. Group, but their work has been hampered by a lack of records, the former Committee having retained all field records. The dispute over this issue had seriously interfered with the work of Council, taking up a large percentage of its time during the year.

Sadly, a number of members have died during the year, including Past-President Hugh Stewart, and Norman Wakefield, whose untimely death has been a particular blow to the Club. A Memorial Fund has been opened, and some suggestions have been considered, but this can only be a success if some member, or group of members, is prepared to assume responsibility for its organisation.

Plans to revise the Articles and By-Laws have been held up pending the

outcome of discussions with the Country Clubs, but as the latter have decided not to enter into a closer relationship with the F.N.C.V., the revision by the Club Improvement Committee will now go ahead.

Hopefully the secretarial problems will be eased in the New Year. The Secretary is having a bungalow built which, among other things, will provide a more adequate home for the Club records, so that a secretarial assistant will be able to handle most of the routine work. The records are in considerable disorder, and if there is anyone with experience in filing systems who would be prepared to assist in sorting them out, their help would be greatly appreciated. Help will also be required with typing out the Cumulative Index mentioned earlier.

In conclusion, we feel that 1972 has been a better year for the Club, but that we still have a long way to go before we can again play our proper role in the study and conservation of Natural History.

ROGER RIORDAN,
Honorary Secretary.

Annual General Meeting — 14 March, 1973

Mr. Tom Sault, retiring President, took the chair at the Annual Meeting with a smaller than usual attendance of members. The Secretary read the Annual Report of Council which will be printed separately. The financial statement was presented by the Treasurer, Mr. Harry Bishop. He reminded members that had it not been for grants from the Ingram Trust and the State Treasury we would be showing a deficit of over \$1,000. Mr. Dan McInnes spoke about the sum of over \$2,000 which the Club received from royalties and profit on sales of the book, "Flowers and Plants of Victoria", by Cochrane, Fuhrer, Rotherham and Willis, which is now sold out.

All nominees for Club offices and Council, which were listed in the March "Naturalist" were elected unopposed, with the exception of Mr. D. Kelly, who had to withdraw due to a transfer to Ballarat. The retiring President also automatically remains on Council so that there is only one vacancy to be

filled, for which Council would be pleased to receive a nomination as soon as possible.

For the first time for many years a Presidential address was included in an Annual Meeting. Mr. Sault reviewed some of the changes which he had seen in the Club and its activities during his ten years of membership. He referred particularly to the increasing number of young people who were active and accepting positions of responsibility in the Club, and said that this was no doubt due to the influence of the various junior clubs. He stressed the importance of these groups and urged members to support them whenever possible. Mr. Sault also spoke about the Club's role in promoting the conservation of the environment, and of the need to enlarge our membership which has remained about the same for many years, and has not reflected the growing community interest in the natural environment. He suggested that we may need to consider the desirability of advertising as a means of increasing membership. A vote of thanks to Mr. Sault for his fine work with the Club was proposed by Mr. D. McInnes, and endorsed warmly by those present.

A report on the formation of the Victorian Field Naturalists' Clubs Association was given by Mr. Roger Riordan, who attended the inaugural meeting at Shepparton as one of our delegates. It is planned to hold an annual state-wide convention during the Labor Day week-end each year.

Exhibits at the meeting included gall wasps under the microscope, some plant specimens from the Baw Baw Plateau and a number of garden grown native plants. Several members also contributed brief nature notes. At the conclusion of the meeting the Club wished Mrs. Woollard a happy eightieth birthday anniversary.

Botany Group

Annual Report 1972

Botany Group held ten meetings during the year, attendance by regular members was very good and the average of twenty-two per meeting was slightly higher than for the previous year.

Speakers at the meetings were Messrs. A. Fairhall, "Propagation of Native Plants"; K. Kleinecke, "Some Edible Plants"; Ian Morrison, "Botany of the Mt. Howitt Area"; Tom Sault, "Seaweeds"; Ian Cameron, "Some Aspects of

New Zealand Flora"; John Robin, "Sherbrooke"; Bruce Fuhrer, "Fungi"; Rex Filson spoke on his recent study trip to Europe and Dr. Gretna Weste, "The Invasion of Victorian Forests by *Phytophthora cinnamomi*". There were also two members' nights during the year.

The excursion programme for the year was somewhat curtailed due to transport difficulties, but six outings were held. Two trips were made to the Coranderrk bushland, adjoining Healesville Sanctuary, where members are assisting with a plant survey and the planning of nature trails. A small group joined the Field Survey Group for a day at Cape Lip-trap and we also visited the Beenak area, Ferntree Gully National Park and Murundindi.

The Group staged an exhibit at the annual Nature Show on the theme "Adaptation of Australian Plants to their Environment".

New members are always welcome at Botany Group meetings and outings; there are no formalities to joining, any member of F.N.C.V. is eligible, just come along to the Herbarium Hall on the second Thursday of the month. We would be particularly pleased to see some of the new Club members who are elected each month and give their interest as Botany.

Botany Group — 8 March

The March meeting of Botany Group was well attended and members enjoyed a screening of excellent slides by Mr. Alan Morrison on "Some Plants of the Gulf Country". The slides were grouped according to families and Mr. Morrison gave a most informative commentary on the unfamiliar flora of this sub-tropical area. The plants shown included some uncommon and very colorful species as well as fungi and club mosses.

The Club's Assistant Librarian, Miss Gwen Piper, reviewed several recent periodicals from the Library containing articles of interest to the Group. Following her suggestion Mr. Baines agreed to keep members in touch with recent additions to the Library by giving regular reviews of periodicals and journals.

The excursion sub-committee reported having met, and presented a programme up to September for the last Sunday in each month. The next excursion will be on Sunday, 29th April, to study fungi at Kinglake.

The speakers for the April meeting will be Mr. I. F. (Dick) Morrison and Miss L. White, who will give "Some Impressions of the New Zealand Flora".

An informal discussion was held at the close of the meeting concerning the best way to assist new members and others who want help with basic botany and plant identification. It was agreed that we would take some time at the end of each meeting to discuss a "Flower of the Month", and to try to provide practice for those interested in using a botanical key, particularly "Plants in Victoria", Vol. 2 by J. H. Willis. It was also suggested that some members may appreciate explanation and discussion on the relevant botanical terms. We would be pleased to have questions and suggestions from anyone interested in developing this part of the Group's programme.

Exhibits at the meeting included the native Garland Lily, *Calostemma purpureum*, growing and flowering in a pot; also flowers of *Crowea exalata* and *Correa* species for practice in identification. An appeal was made for more exhibits as a means of increasing interest and promoting discussion at the conclusion of meetings.

Day Group

15 March

Thirty members met at the Park Street entrance of the Botanic Gardens on a fine, pleasant day.

After lunch and holding of our meeting, members met Mr. Alan Gardiner, superintendent of the Gardens, and were conducted through several of the glass-houses. These contain a wonderful collection of exotic indoor plants, cacti, ferns and mosses and orchids which are in bloom practically every month of the year.

At the conclusion of the inspection, Mr. Gardiner was thanked by Mr. Fairhall, and members moved through the gardens on their homeward way. Despite the drought there has been little loss of trees and the lawns and flowers are looking very green and healthy.

Everyone agreed it had been a most interesting and enjoyable day. Members left about 3 p.m.

Geology Group Annual Report

Chairman: R. Dodds.

Acting Secretary: T. Sault.

A monthly average of 17 members and visitors attended throughout the year. This was less than the previous year's

average (19). There were 10 meetings held, one less than normal, owing to a power strike. All the speakers for the year came from within the group. The subjects and speakers were as follows: *March* — Geological features seen on a World Tour (R. Davidson). *April* — Holiday reminiscences (Members). *May* — Geology of Halletts Cove, S.A. (D. Myers). *June* — (Members' Night). *July* — Spar minerals (L. Angior). *August* — Trees and Geology (Mrs. Costermans) plus New Zealand thermal regions (Miss L. Bennett). *September* — Graphite Granite (Mrs. Salau) plus Werribee Gorge (Miss R. Myers). *October* — New Zealand Glaciers (Miss L. Bennett). *November* — The shifting sands of Port Philip (Mr. N. Wigmore). *December* — (Members' Night). Excursions were less than in the previous year. Those held included: Wonthaggi, Leader (Mr. Nim-morvoll), Bacchus Marsh (Mr. S. Rowe), Organ Pipes (Mr. R. Dodds), Brighton to Beaumaris (Mr. D. McInnes).

The Group exhibited at the Nature Show as usual; the exhibit being titled, "Building Stones of Victoria". Although shown 10 years previously the exhibit was in an entirely different format and appeared to attract a reasonable amount of interest.

Field Survey Group

Annual General Meeting — 22 March, 1973.

The Field Survey Group celebrated its first year at the Annual General Meeting of the Group. The committee elected for 1973-74 is: *Chairman*, L. Winsor; *Secretary*, L. Barraclough; *Minute Secretary*, R. St. Clair; *Records Officer*, A. Brook; *National Museum Representative*, Dr. B. Smith; *Residual*, R. Sandell and W. Clark.

The topic for the evening was the Chairman's address, "Land Planarians", in which L. Winsor spoke of the ecology and distribution of Victorian Land Planarians which he is studying. The meeting closed with supper.

F.S.G. Camp Reports

January — Mt. Erica Camp

Five members met at Erica and proceeded to Mt. Erica where they collected specimens from the base and summit. Walhalla and Aberfeldy were also surveyed for invertebrates, frogs and botanical specimens. The group joined the Mammal Survey Group — F.N.C.V., on

the Sunday evening. The Thomson River and Jericho on the Jordan River were visited. Many interesting specimens were collected, including one of Victoria's endemic frogs, *Litoria maculata*, in a new locality. *Peripatus* sp. and four species of land planarians were collected. Numerous specimens of liverworts were collected by L. Barraclough, and A. Burns and A. Kelly added many arachnids and beetles to their collection. Transport on this camp was only one car, and as a result much special equipment had to remain in Melbourne, which in turn reduced the efficiency of the group.

February — Boola-Boola Camp

This camp was held in the Boola-Boola forest area north of Traralgon. Soon after the arrival of six members in two cars, fine rain made collecting work difficult. The forest area produced little of interest, large areas having been ravaged by A.P.M. for pulp milling. The group camped at the "Boola-Boola Camp", and a night survey team set out for the south-east of Traralgon. Night surveying yielded some specimens of frogs, but little else. On Sunday, the survey moved south of Traralgon and some success was had in collecting frogs, plants and invertebrates. Large areas cleared of timber were overgrown with blackberries, which hampered the survey work. Late afternoon, the group returned to Melbourne.

March Camp — Avoca Area

Four members of F.S.G. attended this camp in the Avoca area. The predominantly farming district yielded many specimens of frogs, centipedes, molluscs and planarians. Collecting was done in the Pyrenees Ranges which produced

different species from those of the surrounding district. Fine weather made a most enjoyable week-end, and good collecting, despite recent severe flooding of much of the area covered by the survey.

February:

The topic for the evening was "Taxonomy and its Use", given by A. Brook and L. Winsor. A brief historical background and an introduction to the binomial system of zoological nomenclature was given by L. Winsor. A. Brook then covered problems of classification of animals, illustrating his topic with excellent transparencies. Grid maps were made available to members, enabling them to plot the distribution of animals or plants in which they are interested.

Part I of a field guide for collectors, printed, using the club card duplicator, was available to members. The field guide will set out habitat types, collecting, preserving and grid survey techniques. A larger manual for base reference is planned, in which all animal and plant groups will be detailed together with important points about collecting and preserving techniques applied in each case. It is hoped that these field guides, once tested and amended will provide the basis for a published field guide for naturalists. Mike Howes and Robin Sandell are concentrating on terrestrial isopods and amphipods respectively, thus increasing group specialization in cryptozoic animals. The Group will make reports to L.C.C. on the Melbourne study area on the distribution and ecology of animals it has studied and surveyed.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

Field Survey Group

Annual Report 1972

F.S.G. Committee:

Chairman — Leigh Winsor.

Secretary — Dave Barham.

Minute Secretary — Rosalind St. Clair.

Records Officer — Arthur Brooks.

Barbara Hooke, Linda Barraclough,
Dr. Brian Smith.

The Field Survey Group was formed in February 1972, following interest expressed in field work at the December meeting of the Club, 1971. Formation of the group was approved by Council and its inaugural meeting held in March 1972.

The group has steadily grown over the year, and as a result of camps, individual study and support within the group, a considerable degree of expertise has been achieved in specialised fields. Currently group members are specialising in the following:

Arthur Brooks — Frogs.

Linda Barraclough — Fungi and Liverworts.

Barbara Hooke — Acacias and Eucalypts.

Dave and Ria Barham, Michael Coulthard — Spiders.

Adrian Kelly — Beetles.

Alan Burns — Scorpions, Centipedes and Millipedes.

Leigh Winsor — Land Flatworms.

In addition, the group assists Dr. Victorian Non-Marine Molluscs.

Meetings — Monthly meetings alternate between a speaker and group discussion on the group's survey work. Dr. Brian Smith has addressed the group on Grid Surveying techniques, and on the National Museum and its work. Miss L. Barraclough spoke on Vegetation in Mountain Areas, and Dr. Alan Bridgewater on Botanical Surveying techniques.

Camps — Throughout the year eight survey camps were held:—

Barringo, near Mt. Macedon.

Mt. Disappointment, with Mammal Survey Group (F.N.C.V.).

Siberia Gap, near Healesville.

Cape Liptrap.

Mortimer Park, Gembrook.

Mt. Disappointment (farming areas).

Stoney Rises, Colac, with Mammal Survey Group (F.N.C.V.).

Mt. Hickey, near Broadford, with Mammal Survey Group (F.N.C.V.)

McAllister Water Shed — Christmas Camp.

The group gained valuable experience in grid survey techniques through these survey camps, and the Christmas Camp for 1972 is the culmination of the year's work. The group has found itself able to rapidly survey large areas during daytime or at night, taking representative specimen samples at frequent intervals.

Nature Show — The group exhibit for the Nature Show 1972 depicted the activities of the group and also how we process and identify plants and invertebrate animals.

Personal Projects — Initial difficulties in obtaining detailed reference works hindered many projects, but most members have by now made some progress. Mr. Arthur Brooks has obtained valuable data on frog distribution and behaviour, supplementing his previous extensive studies in this field. Many spiders are now able to be identified, due to the efforts of Dave and Ria Barham, and Michael Coulthard. Assistance in this field was offered by Mr. M. Grey, Curator of Arachnids of the Australian Museum, Sydney, Scorpions, Centipedes and

Millipedes are a difficult group with which to work, as most references are in German. Alan Burns has tackled this difficult group. Millipedes were studied by Barry Cooper until he left for America in September. Leigh Winsor has studied land flatworms and obtained interesting data on their distribution and behaviour. A new flatworm record for Victoria was obtained during these studies.

Linda Barraclough, Barbara Hooke and John Robins did a large amount of work in plant identification, but in order to pursue their interests in depth, have restricted themselves to Fungi, Liverworts, Acacias and Eucalypts.

Members—The group was unfortunate to lose the guiding spirit and enthusiasm of Barry Cooper when he left for the U.S.A. to further his studies. However, regular contact

with Barry is maintained and we regard him as a "far country" member.

New members have expressed interest in several fields and the group hopes to promote these interests further in 1973.

In November, Leigh Winsor spoke to the Colac F.N.C. about the group's activities, and our work in the area was facilitated by the Colac F.N.C. Since then, Jamie Davis of Colac has joined the group, and is able to attend our camps.

The success of the group in such a short time is largely due to the untiring work of the committee, particularly the group secretaries (B. Cooper and D. Barham) over 1972, and to the valued and enthusiastic support of Dr. Brian Smith, Curator of Invertebrates, National Museum. To them the group expresses its sincere thanks.



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Key Office-Bearers, 1972-1973.

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Mr. T. SAULT

Hon. Secretary: Mr. R. H. RIORDAN, 15 Regent St., East Brighton, 3187. 92 8579

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 14 May— At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — “An Introduction to Insects”: Mr. P. Kelly.

New Members:

Ordinary:

Mrs. J. Hayward, 491 Glenferrie Road, Hawthorn 3122. *General*.
Mr. Gregory J. Hocking, 45 Highwood Drive, Glen Waverley 3150.
Miss Lillian Lenne, 76 Cooper Street, Essendon 3040. *Plant Diseases*.
Mrs. A. D. Morris, 1/49 Seymour Road, Elsternwick 3185.
Mrs. E. L. Saunders, 147 Marshall Street, Ivanhoe 3079.
Mr. Andrew Benwell, 334 Barkers Road, Hawthorn 3122. *Mammals*.

Joint:

Mr. James F. Hutton and Mrs. Elaine V. A. Hutton, 10 Bolton Street, Beaumaris 3193. *Geology, Mammals, Birds*.
Mrs. Esme J. Kent, 16 Papua Street, Watsonia, 3087.
Mr. and Mrs. B. Abbott, 30 Lincoln Road, Essendon 3040. *Botany*.

Junior:

Christopher Lyons, 11 Esper Avenue, South Oakleigh 3167. *Palaeontology*.
Charles Meredith, Geelong Grammar School, Timbertop, P.B., Mansfield 3722.

Monday, 11 June — (To be announced).

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated.)

Wednesday, 9 May — Geology Group meeting.

Thursday, 10 May — Botany Group. Speaker, Mrs. P. Matches: “An Introduction to the Rushes and Sedges”.

Wednesday, 16 May — Microscopical Group.

Thursday, 24 May — F.S.G. General Meeting at 8 p.m. in Conference Room, National Museum.

Sunday, 27 May — Botany Group Excursion, Mornington Peninsula.

Monday, 4 June — Marine Biology and Entomology Group meeting at Library Conference Room, National Museum.

Wednesday, 6 June — Geology Group.

Thursday, 14 June — Botany Group.

JUNIOR F.N.C. MEETINGS

Friday, 25 May — Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 1 June — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 8 June — Montmorency and District in Scout Hall, Petrie Park at 8.00 p.m.

Friday, 8 June — Black Rock Juniors at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

F.N.C.V. EXCURSIONS

Thursday, 17 May — Day Group. Wattle Park Tram No. 70 leaving Batman Avenue at 10.48 a.m. Alight at Entrance to Wattle Park. Meet 11.30 a.m. Bring lunch.

Sunday, 20 May — Fungi excursion led by Mr. J. H. Willis. The bus will leave Batman Avenue at 9.30 a.m., but members travelling by private car may join the excursion at Eastland Shopping Centre, Ringwood, at 10.15 a.m., where we will meet a group from the Native Plants Preservation Society who will join us for the day. Bring one meal and a snack. Fare \$2.00.

Plans are in hand for an excursion to the Warrumbungles in the August-September school holidays, leaving Melbourne, Saturday, 28 August. Details should be in the next *Naturalist*.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

Vol. 90, No. 5

14 May, 1973

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. . . the Pyramids, which are tall, fluted blocks of limestone . . . (see leading article, p. 116).

Photo: Author.

May, 1973

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Camping in the Caves Country

Labour Day Week-end – 9 to 12 March 1973

by ELIZABETH K. TURNER

The Caves Country in Victoria is an extensive limestone region running north from Buchan into the Eastern Highlands, and including Murrindal.

These limestones which formed in Silurian and Devonian times (approximately some 400 to 100 million years B.P.) represent the sedimentary calcareous parts of marine animals, accumulated on the floor of the ancient Palaeozoic sea.

These skeletons are composed of calcium carbonate which is soluble in water containing carbon dioxide; rain water obtains this gas from the air as well as oxygen and humic acids from the soil. This acidulated water percolates in along fissures and joints in the rocks, dissolving the limestone and forming caves and channels.

Water and acid calcium carbonate in solution drips from the roof of these caves and in the process the gas, carbon dioxide, is lost, thus calcium carbonate is precipitated to form stalactites which may be variously coloured by other chemicals such as iron.

On the floor of the caves below, the calcium carbonate is deposited as rounded masses, or stalagmites. Over the years, the roofs of these caves have frequently collapsed to form sink holes, a few of which are visible from the Buchan-Murrindal roadway. Where these sink holes have formed in the beds of streams, the waters plunge underground into a swallow hole. Near such a one on the Murrindal river we pitched our tents, choosing a small, elevated, grassy flood plain on the west bank of the river within view of the Pyramids, which

are tall, fluted blocks of limestone, the largest about 40 feet high perched atop and to the north end, of the rounded hill under which the river disappears and runs underground for about $\frac{1}{4}$ of a mile.

A cliff face extends about 250 feet from the Pyramids vertically down to the river to form its eastern bank. This cliff face has concertina-type folds with straight limbs and angular anticlines and synclines, occurring in pinkish-coloured mudstone and bedded limestone. West of the Pyramids there is a large sink hole representing the collapsed roof of Dalley's cave below. Speleologists who have entered this cave have recently sighted a living platypus swimming in water approximately 1,000 feet from the entrance.

The Murrindal river arises in the Black Mountain area to the north, and flows south for about 25 miles along a steep-sided valley formed in the Snowy River volcanic rock. The waters are augmented by those of Butcher's Creek and together they reach the limestone area. Here the river flows along the boundary between the Volcanics and the limestone until it joins the Buchan River. This river arises in the vicinity of the Cobberas (6,025 ft.) and flows south for about 50 miles to join the Snowy River a little south of Buchan. The combined waters from these rivers enter the ocean at Marlo.

We had been told that at this particular season, following the drought, the Murrindal River was so low that all the water went underground and one could dive into the swallow hole

and, by holding one's breath, could come up into the so-called sub-aqua cave. We were too terrified to attempt this feat, but with great trepidation inspected the natural cave entrances along the high west cliff of the river, some of which were marked with the

metal identification disc of the Speleologists.

At Buchan the river flows in its valley tract and the well-incised channels show along their banks small, rounded boulders overlain with deposits of coarse detritus and quartz

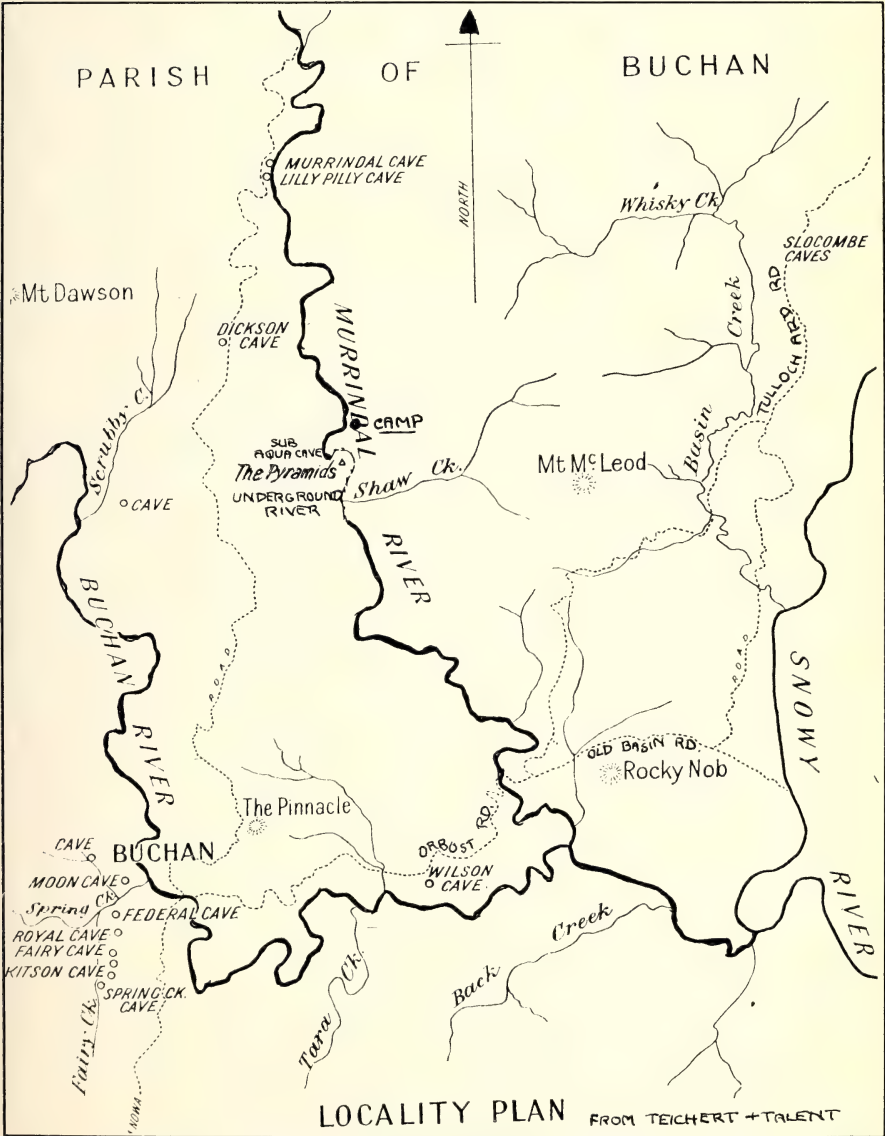


Figure 1: Locality Map of Cave Country.

sand; further north near our camp on the Murrindal the gradient of the river was steeper and the boulders were much larger and angular and of many shapes and colours. The deep red ones were rounded and appeared to be volcanic, possibly a granite porphyry; and these were interspersed with smoke-grey plaques of what appeared to be a mud-stone, and large irregular masses of pale grey mud-stone (with darker limestone nodules which appeared fossiliferous), and blocks of conglomerate with rounded boulders cemented together.

These streams proved difficult and tiring to clamber along, especially in a temperature of more than 30° C.,

but the river water was cool as it emerged from the hillside some $\frac{1}{4}$ mile or so south of the swallow hole, and this proved an excellent place for a bathe.

Before leaving Buchan, early on the cloudless, brilliant morning of Saturday 10 March, we noted flocks of Gang-gangs and Sulphur-crested Cockatoos feeding in the Yellow Box (*E. melliodora*). The sounds and sights of the Grey Currawong were common during the weekend, and at one stage at the camp we noted a number of Bell Miners (also common along the river), mercilessly attacking a Currawong which had strayed into their territory.

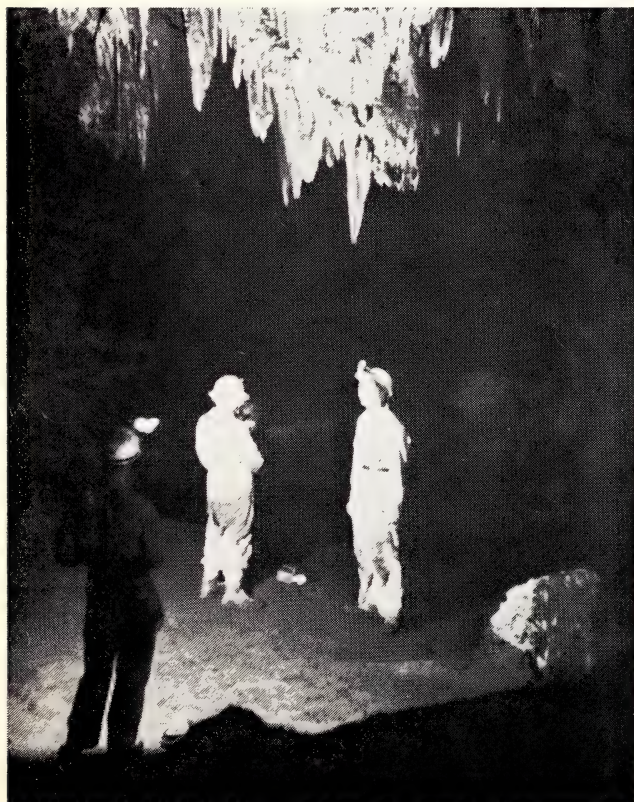


Plate 1

In Dalley's Sink Hole — members of sub-aqua Speleological Society (now incorporated into Victorian Speleological Association).

Photo:
Peter Robertson.

The forest officer in Buchan advised us to travel east along the Orbost road, and then north along the Old Basin Road over the Murrindal River and along to the Tulloch Ard road, which runs more or less on the top of the spur between the Snowy and Murrindal rivers, past Mt. McLeod and through Ash Saddle where there are fine specimens of *E. delegatensis*; until one enters the Tulloch Ard property through a gate, and then by turning west to Butcher's Creek rejoins the main road from Gelantipy south to Murrindal and Buchan. The views from this road over the Snowy River gorges were extremely fine at points where the forest had been cleared.

The Eucalypts were mainly assorted stringy barks, the Brown Stringy Bark (*E. baxteri*) being in abundance. There were also fine stands of Gippsland Grey Box (*E. bosistoana*), Red and Yellow Box (*E. polyanthemus* and *E. melliodora*); and also the Whitewood (*Acacia mollis*) and the Sunshine Wattle (*A. botryocephala*) in flower. The Black She-oak (*Casuarina littoralis*) seemed plentiful, and the road traversed many fern gullies where Rough Tree Ferns (*Cyathea australis*) *Pomaderris* sp. and *Bedfordia* grew abundantly.

Our fern list over this weekend included:—

Small Rasp-fern (*Doodia caudata*)
var. *dimorpha*

Common Rasp-fern (*D. media*)

Sickle-fern (*Pellara falcata*)

Fan-fern (*Sticherus lobatus*)

Austral Lady-fern (*Athyrium australe*)

Mother Shield-fern (*Polystichum proliferum*)

Maiden-hair Fern (*Adiantum aethiopicum*)

Common Spleenwort (*Asplenium trichomanes*)

Rock-fern (*Cheilanthes tenuifolia*)

Finger-fern (*Grammitis billardieri*)

Fishbone Water-fern (*Blechnum nudum*)

Bats'-wing Fern (*Histiopteris incisa*)

We were treated to some very close views of a black goanna, 4' 6" long, which had brilliant yellow bands encircling his horny limbs (? *Varanus varius*). He crossed the track at great speed and then climbed up to about 10 feet on a eucalypt sapling, and froze in a suitable pose for photography. Later, when disturbed, he climbed to the top of the tree making quite a terrifying hissing sound.

Amongst the ground cover in the Stringy-bark forests of the area we found masses of *Stypandra* and *Dianella* plants not in flower; and in flower, Red Correa (*C. reflexa*), the Golden Everlasting (*Helichrysum bracteatum*), the Lavender Bottle-daisy (*Lagenophora stipitata*), and the minute Pink Pea flowers of the Variable Tic-trefoil (*Desmodium varians*). Some *Prostanthera* sp., had been lately in flower.

Growing thickly along the coarse, sandy, graded reaches of the river below the flat east bank on which our tents were pitched, was the Kanooka (*Tristania laurina*) also lately in flower, the fallen fruits of which attracted a large flock of beautiful deep-grey Wonga pigeons with creamy white crowns, throats and abdomens. These fine creatures flew off one by one with a loud whirring of wings at our approach. We were able to see only one King Parrot; but Crimson Rosellas were common. Our camp site provided an excellent post to observe the hundreds of Bell Miners in the surrounding Yellow Box trees. These pretty olive-green birds with orange legs and bills and a bright

yellow patch in front of the eye, began a tentative "tinking" at dawn. This sound was made by the bird while flying or stationary, whilst eating the mealy bug on the leaves, and continued in a crescendo until a kind of plateau of sound was reached about the time the sun's rays surmounted the high, forested hills on the east side of the valley. A decrescendo of sound occurred around dusk, but there were still a few "tinks" heard after darkness. These birds were observed to occasionally fly down to the river pools. The unmistakable song of several lyre-birds was enjoyed in the early morning from the comfort of our sleeping bags; and Noisy Miners with their bright yellow bills and legs were a common sight.

We had intended exploring the Pyramids and the nearby sink-hole further on the Sunday afternoon where one of us, during a visit in January several years previously, had discovered the Shrubby *Platysace lanceolata* and the Large-leaf Bush Pea (*Pultenaea daphnoides*) in flower; and also the Turnip-Wood (*Rapanea howittiana*), (a tree with small blue fruits on its stems), and the satiny

white flowers of the Grevillea-like *Lomatia myricoides*. Among the climbers she had observed were the tough *Marsdenia rostrata* of the East Gippsland jungles and the Wombat berry (*Eustrephus latifolius*). This latter we also observed growing below the Burgan (*Leptospermum ericoides*) covered banks of the river, along with occasional bushes of the crimson and the cream Bottle-brushes (*Callistemon citrinus* and *palludosus*).

Our exploratory excursion on the hot Sunday afternoon was severely curtailed due to a mishap with the car on the narrow mountain track, necessitating a tiring walk north for about four miles to obtain help from our friends the McRae's at the homestead, all of which proved unnecessary in the end as the three young male Speleologists (the only other campers in the area) returned home in time to manhandle the car back on to the track again.

Among the Eucalypts, we observed the Cherry Ballart (*Exocarpus cupressiformis*) and the Hop-bush (*Dodonaea attenuata*). Along the east river bank we also found flowering specimens of the Labiate *Plectranthus*



Plate 2

The camp on grassy flood plain of west bank of Murrindal River.

Photo: Author.

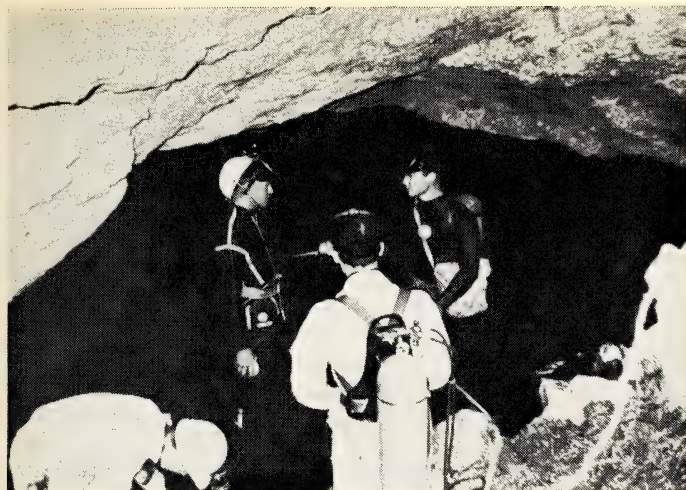


Plate 3

Members of Subaqua Speleological Society preparing to dive into sub-aqua cave.

Photo:
Graeme Wilson.

australis; while clinging to the vertical west cliffs of the river were some fine trees of the Sweet Pittosporum (*P. undulatum*).

In the homestead paddocks the predominant remaining trees are the Kurrajong (*Brachychiton diversifolia*). Nearer to the Buchan-Suggan Buggan road than the McRae homestead is a wonderful old stone house, now painted creamy-white with pale blue trimmings of doors and windows, and

with ancient chimney pieces, a long verandah, and the irregularities of structure which denote antiquity.

From the roadway it is possible to visit the very large, still unenclosed Murrindal Cave and the Lilly Pilly Cave.

On Monday morning we were awakened, to our dismay, by the sound of raindrops on the canvas and the contemplation of packing wet tents was a trifle disturbing. However



Plate 4

Pool in Murrindal River after it emerges from underground channel, showing large, angular rocks — volcanic, limestone and mudstone.

Photo: Author.

the sun soon shone again and we packed and travelled back to Melbourne in comfort.

It seemed to us that this camping weekend had been near to ideal, with windless, fine weather, a sheltered, flat camp site, a nearby deep pool of drinkable river water, constant day-time music supplied by the Bell Miners and Lyrebirds, comparative freedom from pests of all varieties and, as a special bonus, fresh mushrooms for tea. These were collected from the grassy isthmus of land north of the swallow hole where, at first sight the grass seemed full of enormous mushrooms, but these were discovered to be mainly large specimens

of a leathery puff ball, fully 8" in diameter which disclosed a succulent-looking deep purple mass of spores, once the leathery peridium was split back from the top centre. These may have been edible to wise or experimentally minded mycologists but to us, two of whom were medical doctors, discretion seemed the better part of valour!

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The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name

[continued from 90 (3)]

by JAMES A. BAINES

Boerhavia. Named by L. after Hermann Boerhaave (1668-1738), professor of medicine, botany and chemistry at the University of Leyden. His encyclopaedic medical books were translated into many European languages; his book on chemical elements appeared in 1724.

Boisduvalia. After J. A. Boisduval (1801-1872), a noted French etymologist and botanist who published *Flore Francaise* in 3 volumes in 1828. (*Boisduvalia tasmanica* is now *Epilobium curtisiae*.)

Boronia. Named by Sir J. E. Smith after Francesco Borone (died 1794, aged 25, in an accidental fall from a window in Athens when working for English botanist John Sibthorp, author of *Flora Graeca*). As a lad

from Milan he helped Smith during his European botanizing in 1787, and was assistant to Afzelius in Sierra Leone. Smith wrote: "I think he had more acuteness in finding out specific differences of plants than anybody I ever knew".

Borya. Named by La Billardiére after J. B. Bory de Saint-Vincent (1780-1846), who wrote on the seaweeds collected on the voyage of the *Coquille*, giving the first descriptions of the genera *Durvillea* (named after Dumont d'Urville), *Lessonia*, *Iridea*, etc.

Bossiaea. Named by Ventenat after de Boissieu La Martinière (died 1788), French physician and botanist with La Pérouse, who perished with his leader at Vanikoro in the Santa

Cruz Islands, after the visit to early Sydney.

Boussingaultia. Named by Kunth after Jean-Baptiste Boussingault (1802-1887), professor of chemistry at Lyons, then of agriculture. The greatest agronomist of the 19th century, he has been called the "Father of Agronomy". (Now *Anredera*.)

Brunonia. Named by Sir James E. Smith after Robert Brown, the botanist with Flinders in the *Investigator*, who became one of Britain's greatest. Born Montrose in Scotland in 1773, died London 1858. First Keeper of the Botanical Department, British Museum; librarian to Sir Joseph Banks; author of *Prodromus Florae Novae Hollandiae* (1810), in which great numbers of new Australian species were described. He is also commemorated by the specific name *brownii* given to many Australian plants.

Burchardia. Named by Robert Brown after J. H. Burckhard, a German botanist. (*B. umbellata* was named *Reya umbellata* in 1891 by O. Kuntze, after Eugene Rey, a zoologist, but Brown's name remains valid.)

Burnettia. Named by Lindley after Gilbert Thomas Burnett (1800-1835), professor of botany, King's College, London; author of *Outlines of Botany* and *Plantae Utiliores* (Useful Plants).

Calandrinia. Named by Kunth after Jean Louis Calandrini (1703-1758), professor of mathematics and philosophy at Geneva.

Caleana. Named by R. Brown after George Caley (1770?-1829), collector for Banks in New South Wales, and explorer of the Blue Mountains. See *Reflections on the Colony of New South Wales*, by George Caley (edited by J. E. B. Currey).

Candollea. Named by La Billardière after A. P. de Candolle, noted French botanist (1778-1841). Originally Swiss, but moved from Geneva to Paris in 1796. He introduced his system of plant classification in *Flore Francaise* (1803-1815); professor of botany, University of Montpellier, then professor of natural science at Geneva. (Now *Styloidium*.)

**Carrichtera*. This plant, *C. annua* (syn. *Vella annua*), not in Ewart, but in Black as Ward's Weed, was given its generic name by De Candolle, after an obscure character named Carrichter!

Cassinia. Named by R. Brown after Count Henri de Cassini (1781-1832), a French botanist who specialized in Compositae. The other famous members of this Cassini family were astronomers, but Henri gave up astronomy for botany. He published *Opuscules Phytologiques* in 1826.

Celmisia. Named by Cassini after Celmisios, son of the Greek nymph Alciope, for whom a related genus was named.

Claytonia. Named by L. after John Clayton (1686-1773), an American botanist who came to Virginia from England in 1705. (Now *Montia*.)

Cooperookia. Named by R. C. Carolin after a small township near Taree in N.S.W., Cooperook, which is not Cooper's Nook, but an Aboriginal word meaning elbow, probably so named from a bend in a local stream. *C. barbata* was named *Goodenia barbata* by R. Brown, but this Purple Goodenia was found to be worthy of separate generic status within the Goodeniaceae.

Correa. Named by Andrews after Jose Francisco Correa da Serra (1751-1823), a Portuguese botanist,

scholar and statesman. He founded the Portuguese Academy of Sciences at Lisbon, and went to France to escape the Inquisition. Secretary to Portuguese Embassy in London; minister at Washington, then deputy to Cortes (Parliament) in Portugal after 1820. Wrote a history of Portugal in 4 volumes; the botanical name is usually pronounced with the accent on the first syllable, but his surname is accented on the second syllable.

Cupania. After Francesco Cupani (1657-1711), an Italian monk who wrote works on Sicilian plants. (Now *Alectryon*.)

Dampiera. Named by R. Brown after William Dampier (1652-1715), English buccaneer who made visits in 1688 and 1699 to Australia's north-west coast. Twice circumnavigated the globe; collected plants in Brazil, Timor and New Guinea as well as "New Holland"; his plants such as the Sturt Pea (which rightly should be called Dampier Pea as he

saw it long before Sturt) are still kept at Oxford.

Danthonia. Named by De Candolle after Etienne Danthoine, a French botanist, of Marseilles.

Darwinia. After Erasmus Darwin (1731-1802), physician, poet, botanist; grandfather of Charles Darwin and Francis Galton. He cultivated an 8-acre botanical garden at Lichfield. He wrote the poetic work, *Botanic Garden: The Temple of Nature*, and in prose works he anticipated views on evolution later expounded by Lamarck.

Davallia. After Edmond Davall (1763-1798), a Swiss botanist of English origin, a friend of Sir J. E. Smith, to whom he left his herbarium and by whom this genus of ferns was named.

Daviesia. Named by Smith after Rev. Hugh Davies, F.L.S. (1739?-1821), author of *Welsh Botany*, 1813. Born, lived and died in Wales, but was M.A. of Oxford.

(To be continued.)

Nature Notes from the Gold Coast

by

ALEX. N. BURNS

The past spring and summer has been a good season for the breeding of the Scrub Turkeys in the Burleigh National Park; an estimate from counts made at feeding time each late afternoon indicates an increase of young birds at about 46. This indeed is only a very moderate percentage from the number of eggs laid in the nesting mounds. Although almost immediately after hatching, the young turkeys are able to forage for them-

selves and can run swiftly and even climb up sloping trees, the greatest number of casualties is caused by feral cats. Of these, many inhabit the park at times and take a considerable toll of small birds and even lizards. Many residents living in close proximity to the park keep cats, often in numbers. One person had at one stage last year, no less than fourteen! Fortunately over the past few months

this total has been reduced by at least 75 per cent.

The rock wallabies too have increased their number considerably, and many of the "joeys" have now left their mothers' pouches and join in with the older ones at feeding times. Koalas also have been, and still are, active; almost daily opposite the garden two or three may be seen sleeping in the forks of the large gums. Whilst preferring the leaves of the so-called Queensland Blue Gum (*Eucalyptus tereticornis*?), the young leaves of the large leaved Box (*Tristania conferta*) are also favoured. This is especially so during showery weather.

At the big lagoon at the Currumbin Bird Sanctuary the black swans are again nesting; this time five eggs have been laid, and these are due to hatch within the next week or ten days. The little Wood Duck companion of the swans waits patiently near the nest which is close to the water's edge. This friendly relationship between them has persisted for several years. The Ibis population remains about the same, also that of the other birds; but we now have in addition especially in showery weather, a large complement of Sea-gulls.

In the home garden, the Buddleias have flowered again, but the white predatory spiders are now absent. On one fairly large bush a large brown Praying Mantis took up its abode some six weeks ago. After a few days it constructed a large creamy-grey egg sac, but it still remained on the bush. During the past week the young mantises have emerged and have spread to neighbouring shrubs and plants. Their mother has been taking quite a toll of butterflies. Those observed being eaten have included the Australian Leafwing, (*Doleschallia bisaltide australis* Feld.), the Common Grass Yellow, (*Eurema hecabe phoe-*

bus Butl.), and strangely enough a species distasteful to birds, the Black and White Tiger, (*Danaus affinis affinis* Fab.). The mantis took less than half an hour to eat this latter victim, only the wings being left! Another interesting "victim" was a large third stage short horned Grasshopper (*Orthoptera-Acridiidae*), a case of one Orthopterous insect preying upon another.

Larvae of the Evening Brown Butterfly (*Melanitis leda bankia* Fab.), have been taken freely over the past couple of weeks. These beautiful apple green caterpillars with two brown or blackish horns on their heads normally feed at night and shelter by day amongst leaves and debris at the base of the foodplants. During showery weather however these larvae will ascend the leaves and stems of the grasses on which they feed in the daytime. Any type of tall growing grass is eaten, also the Common Blady Grass (*Imperata* sp.). Many of these larvae are being parasitized by Tachinid Flies (*Diptera-Tachinidae*), because some of the larger specimens collected had one or more of the white fly eggs adhering to their bodies. Most of these eggs are laid on the anterior end of the caterpillar's body; a few are even laid on the head itself. With a good pair of forceps it is possible to crush the parasite eggs before they hatch and so save the caterpillar from destruction by a natural enemy.

Webs of very large Orb-Web Spinning Spiders are prevalent at the present time, and often with the large bodied occupant present in its web. One web examined a couple of days ago had two forewings of a female Richmond Birdwing butterfly (*Ornithoptera priamus richmondii* Gray.), as well as remains of small moths and beetles. So the struggle for existence goes on, and the balance of Nature is preserved.

An Avoca River—Wirrengren Plain Aboriginal Trade Route

by ALDO MASSOLA*

Trade-routes is the term now used to describe the native paths that once criss-crossed the countryside in every direction and enabled the Aborigines to reach and maintain contact with even the most outlying groups, inhabiting the most unhospitable regions.

Some of these paths were well defined tracks. C. B. Hall, a pioneer in the Grampians, recorded that he had found one about 15 miles north of Mt. William leading to the sources of the Glenelg River, and another through the tea-tree scrub on the Wannon River, near Mt. Sturgeon.¹ He described them as being much like cattle tracks, except that they passed over places which cattle were not likely to attempt. Elsewhere, such as on sandy soil and in the Mallee country, it is probable that the paths would not have been very distinct and could have passed unnoticed by the settlers; but there is no doubt that the better defined ones were used by the early colonists, and, in some cases, these developed into our present day main roads, such as, for instance, the Omeo Highway between Omeo and Bairnsdale.

Whenever possible the paths followed water courses, since the travellers were then assured of water; in fact, over most of Western Victoria the native word for path was the same as that for creek: *bah*, or *bar*, contracted from *Baring* and its local variants, which still survives in some place names, such as Barwidge (*bar-witchie* creek with rushes growing in it); Baring (the creek or the track); Baringhup (*baringug*, his tracks); the Avoca

Creek (*witchellibah*, *witchelli*, dry reeds, *bah*, creek); The Wimmera (*Barrh*, the path)².

When water courses were not present or could not be followed the native tracks generally ran from one waterhole or swamp to the next, even if it meant some lengthening of the route; and lacking these, to where water could be obtained by digging in soaks, or obtained from yabbie holes (known as crab holes in Western Victoria) or the roots of certain species of Mallee trees³. In particularly dry country water was carried in possum or wallaby skin bags.

Campsites seem to occur along these tracks at about every 5 miles, thus denoting that under ordinary leisurely circumstances 5 miles was the average distance covered in one day. This is a fair average for families burdened with young children and hunting and gathering food on the way.

Many of these tracks led to the great intertribal meeting places where allied tribes were wont to periodically meet for ceremonial purposes or to exchange raw materials and manufactured goods. The time of the meetings generally coincided with the season when that particular locality offered an especially desirable food, such as bogong moths in the Highlands, *lerp* (manna) in the Mallee or eels in certain rivers or lakes. Hundreds of Aborigines then converged to the locality from all directions. However each participant was either a member of one of the many groups composing

*4/18 Wolseley St., Mont Albert.

the tribal unit, or of one of the groups of an allied neighbouring tribe.

Though the goods exchanged at the meeting could include some that had come from a long way, they were still brought by neighbours and not necessarily by the original manufacturers. In other words: an object from A could not reach D without first being traded through B and C. Thus possum fur armlets brought down from the Murray River to Wirrengren Plain were exchanged with the Avoca River people who later exchanged them with the Jajawurong of the Loddon River, who, in turn exchanged them with the Wurunjeri of the Yarra.

Several of these meeting places have been recorded, and, in the Western District, these include Mt. Noorat (old man kangaroo) and nearby Lake Keilambete (*kill-om-beet*, yellow-skum-on-the-water); Lake Bolac (*buluk*, frog); Buckley Swamp (*yatchaw*, meaning unknown); and Lake Connewarre (*keingean*, Major Mitchell's parrot). A glance at a map, however, will disclose that all these places could easily be reached from any direction by following water courses or by way of conveniently situated swamps and lakes.

It was a different matter for the Wotjobaluk people of the Mallee and Wimmera: theirs was a much drier country and the knowledge of the position of the few places where permanent, or at least seasonal water was available, was all important to them. Yet these people's great meeting places included Wirrengren Plain, at the end of the Wimmera River system, which, even today, is one of the most hard-to-get-to places in Victoria.

Elsewhere I reported the discovery of this campsite⁴, its associated legends⁵, and the northern and southern routes by which the Aborigines of the Murray River and those of the

Grampians and the Wimmera River reached it. But Aborigines from the Avoca, and even from the headwaters of the Loddon reached it also. Howitt⁶ explicitly states that his Jajaurung informant (who was related to the Wotjobaluk people through descent in the female line and could thus attend their meetings) who lived in the neighbourhood of St. Arnaud, had brought word to the Jajaurung living at Charlotte Plains (north of Havelock, on the headwaters of the Loddon River), where there was a stone axe quarry⁷, that the Wotjobaluk of Lake Hindmarsh were in want of stone axes "and this material was obtained from the quarry and carried up to the next meeting of the tribes on the Wimmera for barter by my informant's father".

By the 'Wimmera' I take Howitt to mean the *end* of the Wimmera, Wirrengren Plain, where the great meetings used to take place; and it is therefore my purpose, in this paper, to place on record the result of my researches upon the native route between Charlotte Plains and Wirrengren Plain, over the intervening long stretches of now waterless country, a distance of approximately 250 miles.

Some clues of the route are furnished by Howitt. He states⁸ that his informant's Jajawurung grandfather went to a place now called Pine Plains (north of Wyperfeld National Park) where he obtained a Wotjobaluk wife. His son (Howitt's informant's father) was born in Jajawurung country, and when old enough obtained a wife from Kulkaine (Murray River) at Morton Plains (north of Lake Buloke). Thus it seems probable that, at least in this family's case, instead of crossing over from Bet Bet Creek (at Charlotte Plains) to the Avoca River and then across to the headwaters of the Wimmera, he and his father and his grandfather before him followed the Avoca River as far as Charlton and then took

a course almost due east to Lake Buloke, north to Morton Plains, east to the Wimmera River, then north to Pine and Wirrengren Plains.

My search for the actual route over country which is now entirely cleared and intensively cultivated was greatly facilitated, if not successful, only because of the great assistance I received from Mr. and Mrs. W. H. Wood, of Charlton; Mr. and Mrs. Jack Golding, of Donald; Mr. and Mrs. Ron Falla, of Litchfield; Mr. and Mrs. Doug McColl, of Warracknabeal; and Mr. Keith Hofmaier, of Beulah, who at each of my visits went to no end of trouble to take me to likely places and to enlist the assistance of 'locals' with long memories (who also did their best for me), as well as providing me with a comfortable home while I was in their district. I here wish to express my sincere thanks to each and all of them.

The Route to the West

It is a comparatively easy matter to cross over from the headwaters of the Loddon to the Avoca by means of Bet

Bet Creek and to follow the Avoca north to Charlton⁹. About 3 miles north of Charlton, on a very big sand hill on Mr. Alf Giles property on the west side of the river, there is what was probably the most important, and certainly the most extensive campsite on the Avoca¹⁰.

To the Aborigines this was *Djub-djub-galk*, the-place-of-many-myrtle-trees, and it was the locality from which the *Jupa-galk-wournditch*, or *Djub-ah-galk* people, took their name. It was an important meeting place and trade route junction, and to it came the people from the south and those from the Murray River at Lake Charm, Bael-Bael, and Boga to the north, Lake Buloke and other points to the west, and those from Boort, Buckrabanyule, Mount Korong, and even from the Loddon River to the east.

From this camp the first stop on the way to the west was at a low rise about 4½ miles distant. At this spot there is a large campsite and water was available both from waterholes

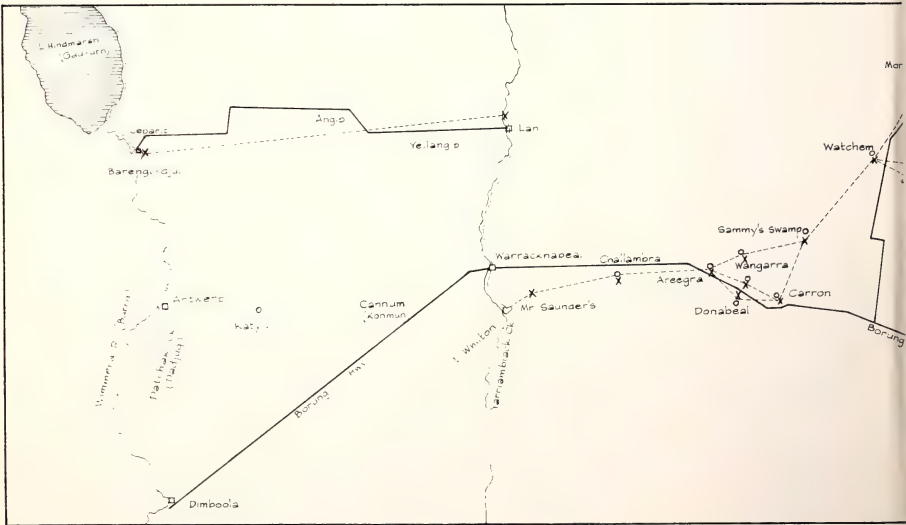


Figure 1

(now dry) and a rockwell, this latter giving the campsite its name: *Yuan-duk*, rockwell¹¹.

Upon leaving Yuanduk a walk of about 5½ miles to the south-east took the travellers to Lake Wooroonook (*wooroomook*, fresh-water turtle) where the campsite has now been ploughed over, though traces of it are still discernible. Lake Wooroonook is permanent water, and no doubt the natives lingered there, feasting upon the turtles after which the place was named.

The next stretch was of 4 miles south-east, to Mt. Jeffcot (native name not available) where there was a campsite and some native ovens at the northern base of the mount. Here water was available from springs.

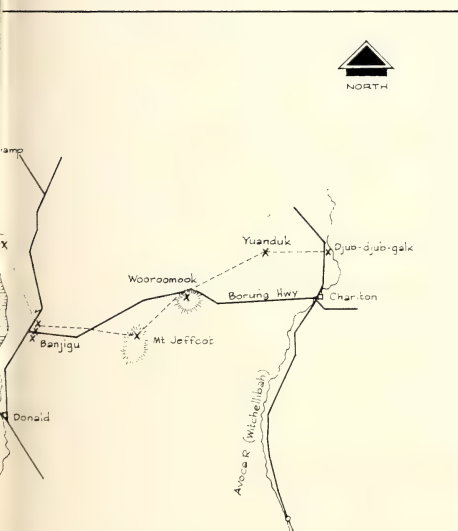
At 5½ miles due east from Mt. Jeffcot there is a very large campsite on the sand ridge marking the eastern margin of Lake Buloke at its full extension. (Lake Buloke was *banyenong*, where - long - ago - the - roots - burned-out). This campsite is probably the one referred to by the Abor-

igines as *Banjigu* (meaning unknown) and said to having been the meeting place for the people from the south (Avon and Richardson Rivers, Batyo-Catyo, Avon Plains, York Plains, and even Carr's Plains) and from the north (Birchip, Woomelang, Tyrell Downs) as well as from the east and the west.¹²

Further westerly progress from this campsite is barred by Lake Buloke, which means that the native path had to go around it either at the north or at the south end. Taking the southern possibility first, there are many native ovens, denoting long occupation, near where the Avon River enters the lake, just north of Donald, and a sizeable campsite at Lake Dunstan, a little to the east of the ovens and about 4½ miles from *Banjigu* campsite. But then there does not appear to be any water to the west for the next 18 miles.

A route to the north of the lake, however, would pass through extensive tracts of low-lying land subject to inundation. A number of swamps and waterholes are encountered, and native ovens are plentiful. There are small campsites at Mini and Watchem Swamps. Morton Plains, just north of Watchem, is also subject to inundation; and it will be remembered that this is the place where Howitt's informant's father obtained his Kulkaine wife.

From Watchem the next campsite in a south-westerly direction is at Sammy's Swamp, just over 5 miles away, and this seems to have been the obvious way to the west since 5 miles beyond Sammy's there is another swamp and campsite, the northernmost of a line of waterholding depressions marking the former bed of Dunmunkle Creek. Fairly evenly spaced water is thus available on Wangarra, Donabeal, Areegra and Challambra Stations on the north and on the south side of the present



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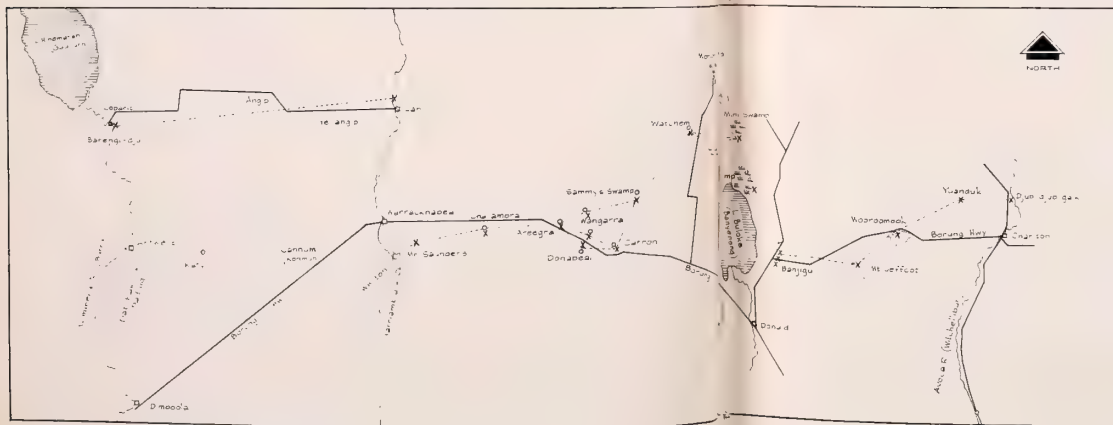


Figure 1

Borong Highway, and, at each water, stone implements have been collected thus proving that the Aborigines visited these places. The natives were thus enabled to travel westward to the next large campsite, which is on a sand hill on Mr. Saunder's property about 2 miles south-east of Warracknabeal and about the same distance east of Yarriambiack Creek.

From this campsite the native path had to traverse a particularly dry stretch of country before the Wimmera River was reached. The Aborigines could have travelled due west and reached one of the campsites, and water, in the vicinity of Antwerp, and then followed the Wimmera north. This route, however, would have meant a 12-mile walk through country for which I have only one locality name, Cannum, which should be *konmun* and means 'thirsty', thus implying that no water at all was available until Katyil (which means 'water' and where there still is a large water-hole) was reached. This water is about 7 miles from Datchak Creek (*dadjug*, his arm, i.e., of the Wimmera), a tributary of the Wimmera.

It is more likely that from Mr. Saunder's campsite the track to the Wimmera first followed the Yarriambiack north to a bend on the creek just north of Lah, where there is a very large campsite which, judging by its size, must have been an important north-south and east-west junction¹³. The track to Wirrengren Plain probably struck off due west from there, though the Wimmera is about 25 miles distant and the intervening countryside was a wilderness of sand hills covered with Mallee scrub. However, judging by locality names, water was not entirely absent. The first is Yellangip, which means crab holes; next comes Angip, which is obviously a contraction of Yellangip, therefore more crab holes from which to draw

underground water; then old local people speak of soaks and of water in holes in red sandstone outcrops scattered here and there through that country; and these must have been known to the Aborigines and have supplemented that which they carried with them in skin bags or obtained from Mallee roots. They would have hurried through this region, and would have crossed it within two days and reached the large campsite at the bend of the Wimmera River just south of Jeparit, which was known to the Aborigines as *Barengi-djul*, the-place-where - the - wallaby - skin - water - bags-are-filled.

This camp (and deep waterhole in the river) must have been an important road junction; and its name fully vindicates my choice of route from the Yarriambiack. The waterbags, of course, would not be filled after reaching the camp; but on the return journey, before the scrub and sand hills were again braved by the Aborigines on the way back to their own country, either east to the Yarriambiack and beyond, or west to Lorquon, Yannac, Broughton and the Tattiarra of South Australia.

From Barenji-djul the journey north must have been very leisurely and pleasant, since it skirted Lake Hindmarsh and Lake Albacutya and, by way of Outlet Creek, went on through what is now Wyperfeld National Park and Pine Plains (where Howitt's informant's grandfather obtained his Wotjobaluk wife) to the end of the 250-mile walkabout at the great meeting on Wirrengren Plain (*werrenjerren*, describes the noise made by many assembled people). Water must have been easily available on this track, even in dry years,¹⁴ since that part of the country was permanently inhabited by the Aborigines.

This also brings me to the end of my journey — the search for this par-

ticular trade route; and there remains but to thank Mrs. Nellie Stewart, of Swan Hill, and pay a tribute to the memory of Walter and Peter Kennedy, of Antwerp, the last of the Aborigines with a knowledge of the Mallee language, who helped me with Aboriginal place names and their meaning¹⁵.

NOTES:

For a complete list of works pertaining to the Aborigines of the Wimmera and mallee see Massola, A., *Bibliography of the Victorian Aborigines*, Hawthorn Press, Melb. 1971.

1 In Bride, T. F. (Edit.) *Letters from Victorian Pioneers*, new edition, Heinemann, Melb. 1969.

2 For other local Aboriginal place names see: Massola, A., *Aboriginal Place Names of South-East Australia and their meaning*, Melb. 1968.

3 For method used by Aborigines to obtain water from trees, yabby holes, etc., see: (A) Massola, A., *The Aborigines of the Mallee*, *Proc. Roy. Soc. Vic.*, 79, 1966; (B) Massola A., *Aboriginal Campsites on Wyperfeld National Park and Pine Plains Station*, *Vic. Nat.* 86, 1969; (C) Old Bushman (W. L. Morton) *Notes of a tour in the Wimmera District* (June and July 1861). Reprinted by National Parks Authority (Vic.) no date.

4 *loc. cit.* 3 (B).

5 *Bunjil's Cave*, Melb. 1968.

6 Howitt, A. W., *Native Tribes of South-East Australia* p. 690, London, 1904.

7 I have not been able to locate this quarry which is mentioned by A. Joyce in *A Homestead History* (Edit. G. F. James, M.U.P. latest edition 1969) as being on Joyce's Creek. It is now probably under the water of Cairn Curran Reservoir.

8 *loc. cit.* (6) p. 248.

9 For campsites on the Avoca River south of Charlton see: Massola, A., *Journey to Aboriginal Victoria*, Rigby, Adel. 1969.

10 This sand hill is currently being quarried for sand and will soon be only a memory. The local Historical Society or other interested Body should see that a commemorative tablet at least be erected on the site.

11 Massola, A., Notes on the Aborigines of the Donald District, *Vic. Nat.* 86, 1969.

12 *loc. cit.* (11). For the mythology of this campsite see *loc. cit.* (5).

13 For campsites on Yarriambiack Creek see Hofmaier, K. C., *Aborigines in the Southern Mallee of Victoria*. *Vic. Hist. Journ.* XXX1, 1960.

14 For campsites of the Wimmera River see *loc. cit.* 3 (B) and *loc. cit.* (5).

15 All the Aboriginal words remembered by these valued informants were collected and published by Mrs. Louise A. Hercus in *The Languages of Victoria: A late survey*, Austr. Inst. Abor. Studies, Canberra, 1969.

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A Note on *Dacelo gigas*

William East remarks in his volume "The Life of Kookaburras and Kingfishers"—

... there are only a few authenticated instances of Kookaburras catching snakes.

In the light of that statement, the following observation may be of interest. On 2 January 1973 on the Traralgon Creek Road 3 or 4 miles south, or upstream from Le Roy, we saw a Kookaburra fly above the road in front of us and land on a branch of a eucalypt across the creek, roughly 100 feet from the edge of the road. The bird was carrying in its beak a snake, held just behind its head, which we estimated to be at least twice the length of the Kookaburra itself, which would make it 3 feet. The snake, which because of the small diameter of the head in relation to its body we thought to be a copperhead, was on first sighting wriggling vigorously. The bird beat the snake against the branch many times — two or three whacks — and then a pause.

Apparently satisfied the snake was dead (it was certainly hanging very limp), the bird manoeuvred the snake head first into its mouth and pro-

ceeded to swallow it — taking at first not a very large proportion of the snake down its gullet. The snake went down in rather a manner of two steps forward one step back, the body of the snake being somewhat regurgitated after each substantial swallow.

In the process, after the tail of the snake had disappeared, it re-appeared three or four times, at first to the extent of four to six inches and lastly only about one inch.

Because of a grossly distended crop the bird looked more like a poor portrayal of a Kookaburra, than the real thing. The bird continued for some minutes sitting on the tree branch looking very uncomfortable. Then all its feathers rose up until the bird appeared about double normal size. It remained in that condition for some minutes, its feathers slowly subsiding. After an interval the bird flew off up the creek valley out of our sight.

The whole process took about 40 minutes. During that time we were watching continuously, each of us having good binoculars.

CEDRIC and CLARE RALPH

A Further Note on the Leathery Puffball

It might be assumed from the note by Mrs. Lyndon *Victorian Naturalist* 90 (3), and the footnote to the article by Marginson and Murray-Smith, *Vict. Naturalist* 89 (8), that the Leathery Puffball, *Mycenastrum corium*, is an exclusively Australian species.

Actually, this fungi is of world wide distribution, and in the Australian region has been collected from as far afield as the Barron Falls near Cairns, to Kalgoorlie in Western Australia. It has also been collected in New Zealand. I have been unable to find any record of its occurrence in

Tasmania, but its presence in the Bass Strait area could indicate merely that it has not been collected from there.

One interesting aspect of these latter collections is their immense size; proof that this plant does particularly well in high rainfall areas.

Mostly, these puffballs are found free of any soil attachment, and so could be bowled along by the wind or carried by flash floods.

Over the past hundred-odd years this fungi has received many names and classifications, but the genus *Mycenastrum* now includes this single species, *M. corium*.

The characteristic separating it from the other members of its family is the spininess of the threads, which, together with the spores, make up the contents of most puffballs.

This spininess need not deter Mrs. Lyndon from her gastronomic experiment, should opportunity offer; for they are evident only under a fairly

powerful microscope. Furthermore as the secret of puffball culinary art is to catch them young and tender, before their contents have started to change colour with maturity, the risk is even lessened.

But there is one apparently truly Australian fungi, the Stone-making Fungi (*Polyporus basilapiloides*), which has had its known range extended from the dry mallee country by recent finds on the beach sand dunes near Wonthaggi, an area not noted for its dryness.

This remarkable fungi makes an apparent food storing body of swollen hyphae, closely intertwining a mass of sand grains; the resulting body being stonelike, both in feel and appearance. A description of it can be found in the F.N.C.V. publication, "Victorian Toadstools and Mushrooms".

G. CRICHTON,
Croydon.

Tribute to Ernest Silvestor Hanks

The Field Naturalists' Club of Victoria has had many outstanding members who have shared their observations and enthusiasms with us in a clear logical way. Such dearly loved and appreciated members were Pearl and Ernest Hanks, an outstanding husband and wife team. They took a leading part in many cultural societies, being life members of the F.N.C.V. since 1925, life members of the Anthropological Society, members of the Henry Lawson Society, the Poetry Lovers, The Australian Literature Society, The Bird Observers (of which

they were both presidents), and the R.A.O.U. Now alas — Ernest died on 12 April 1973.

His presidential address to the R.A.O.U., "Origin of the Parasitic Habit in Cuckoos", was printed in the "Emu" and in overseas papers.

A foundry man, he proved that accepted principles in the textbooks were wrong by demonstrating that solid metal will float in its own melt.

They both had poems and stories published. Our sincere sympathy goes with tenderness to Pearl.

LYNETTE YOUNG.

Colour of Coastal Rocks of the Otway Ranges

Victoria, Australia

by EDMUND D. GILL*

The surface of the moon is dark because no oxygen is present. There is no atmosphere as on earth. A deep mine, a tunnel into a hill, or a deep roadcut reveals fresh rock that is usually dark grey to black in colour. The oxygen of the atmosphere has not combined with them, except where the air gains access down faults, joint planes and such. It is the oxygen of the air combining with the minerals in the rocks that yields the bright yellow, brown and red colours we see at the surface. In the Otways, the soils and rocks that have been oxidized are typically light brown.

On the shores, the rocks do not get much opportunity to combine with the oxygen of the atmosphere, because they are nearly always covered with water or saturated with water, even at low tide. Generally, as a result, the rocks of the shore platforms are some shade of grey, as would be expected. The rocks presenting joint planes or faults may be light brown where air has penetrated when sea level was lower. Occasional small patches of reddish brown oxidized rock a few centimetres across may be noted, but these are merely spots where pyrite has oxidized to iron oxide. However, it is a surprise in many places where the coastal terrain is very steep, to find a grey shore platform and rampart (a higher part of the platform usually at the outer edge) then rocks at the outer edge that are light brown! Where least

opportunity exists at present for oxygen to combine with the rocks, they are oxidized. Rocks thrown up from low tide and below are often oxidized. The process obviously cannot occur now, so must have occurred in the past when sea level was lower, and these rocks were part of the land surface (Gill 1971, 1972). Because the terrain is steep, the sea has cut deeply into unoxidized grey rocks, and the brown rocks at the edge of the platform are part of the former land surface. Out on the most exposed headlands, such as Point Sturt and Point Hawdon, such relics of the old land surface have been destroyed. This is good evidence that destruction of the rocks is occurring there. Where the coastal terrain is not steep, the sea has not cut into the unoxidized rocks, and much of the rock platform is oxidized. Also where the rocks are much broken by numerous joint planes and faults, the air has been able to penetrate, and the rocks are more oxidized.

There is a reason for everything, and this appears to be the explanation of why along the Otway Coast some of the rocks are grey and some are light brown.

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*Deputy Director, National Museum of Victoria

The Names of Minerals

by

DR. A. W. BEASLEY*

There are about 2,000 different mineral species and several thousand varieties of these species. It is interesting to enquire into the origin of their names. The knowledge thereby acquired may be useful for the lapidary, mineral collector and mineralogist.

Unlike plants and animals which have two scientific names, minerals have but one. There are many ways in which minerals can be named. It should be noted that the majority of names end in "ite". This is a relic of the old Greek and Roman "itis" or "ites" which simply means the "nature of the subject". These terminations were added by the Greeks and Romans to ordinary words that denoted qualities, uses, constituents, or localities of minerals. Thus, *siderites* (now *siderite*) was made from the word for iron because the mineral contains iron; *hematites* (now *hematite*) was made from the word for blood because of the red colour of the mineral when powdered. A large number of mineral names are derived from the Greek.

Some of the most common mineral names are so old that their origin is unknown or doubtful. These include quartz, gypsum, tourmaline, corundum, beryl, and galena. However, the origin of the majority of mineral names is known.

With reference to the ways in which minerals are named, one favourite method is to name a mineral after some person, real or mythological. The first modern mineral to be named for a person was *prehnite*, which in 1783 was named by Werner after Colonel von Prehn, who had brought

the first specimen to Europe from the Cape of Good Hope where he had found it. Since that time, hundreds of scientists, rulers, philanthropists, mineral collectors, and other persons have had their names perpetuated in the names of minerals. One of the commonest of minerals, *goethite*, was named after the German poet, Goethe, who was an ardent mineral enthusiast. Minerals named after European rulers include *willemite*, for William I, king of the Netherlands, and *alexandrite*, for Alexander II of Russia. Minerals first recorded from Australia and named after Australians include *raspite*, *marshite*, *newberyite*, *stichtite* and *stillwellite*.

Another favourite method is to name a mineral after the geographic locality or place where it was first discovered. Examples are *labradorite* from Labrador in Canada, *aragonite* from Aragon in Spain and *vesuvianite* from Mount Vesuvius in Italy. Minerals named after Australian localities include *maldonite*, after the town of Maldon in Victoria, and *dundasite* after the township of Dundas in Tasmania. The naming of minerals after localities can lead to a lot of confusion as, following war or independence, borders may be altered and the name of the place may be changed to something quite different, sometimes in a different language; this has been the case with place names in Europe and Africa.

The best method of naming a mineral is after some notable property or some feature of its chemical composition. For instance, the name *azurite* is an instant reminder of the

*National Museum of Victoria

beautiful azure-blue colour of the mineral. Quite a number of mineral names describe their colour. For example, *albite*, an important kind of feldspar, is from the Latin word for "white", while *leucite* comes from the Greek word of the same meaning. *Rhodonite* and *rhodochrosite* both come from the Greek word for "rose", given because of their rose-pink colour.

Various other physical properties have been used in giving names to minerals. For instance, the name *barite* comes from the Greek word for "heavy" and refers to the relatively high specific gravity of the mineral. The name *eucrase* means "to break well" in Greek and indicates the well-developed cleavage of this mineral. Cleavage is also indicated in *microcline* which means "little inclination" and refers to the two main cleavage planes intersecting at almost 90 degrees in this feldspar. Fusibility is referred to clearly by *fluorite*, derived from the Latin word "to flow" because it melts easily. The pearly lustre of *stilbite* is described in its name, which comes from the Greek "to glitter".

Minerals whose names have reference to their chemical composition include *zircon* (zirconium silicate), *magnesite* (magnesium carbonate), *borax* (hydrated sodium borate), *uraninite* (uranium oxide) and *bismuthinite* (bismuth sulphide). *Anyhydrite*, meaning without water, was so called because it contains no water, in contrast to gypsum, which is otherwise like it in composition. If you know your Greek, *chalcopyrite* immediately conveys to you the fact that it contains copper, and *halite* conveys the fact that it is composed of salt (sodium chloride).

Certain mineral names pertain to their use. Among names of this kind is *nephrite*, one of the two kinds of

jade, which was employed as a remedy for kidney disease in ancient times. *Pyrolusite* is from the Greek words "fire" and "to wash" because it is used to remove the colour due to iron impurities in molten glass. *Graphite*, which is used in pencils, gets its name from the Greek *graphein* (to write).

Some mineral names come from the mode of occurrence of the mineral. *Monazite*, for example, acquired its name, which comes from the Greek word *monazein*, meaning to be solitary, in allusion to the rarity of this mineral which occurs in isolated grains in rocks.

A mineral which gets its name from its crystal form is *tetrahedrite*, which commonly occurs in sharply crystallized tetrahedrons.

Most newly named minerals are christened by the mineralogist who first describes them in print. The law of priority is applicable to mineral names and is superseded only when the original name is proved to have been incorrect or inadequate. The mineralogists who make up the International Mineralogical Association have a Commission on New Minerals and Mineral Names which sets high standards for the scientific proof of a new species, and recommends rules to be followed in naming minerals; the mineral and name are frequently approved by it prior to publication. To be given a name, and to be accepted as a distinct and separate species, a mineral must prove to be chemically or structurally different from any other known mineral.

The International Mineralogical Association also makes recommendations concerning the preferred spelling of mineral names and the preferred name of species and varieties where there are two or more names in common use. For example, *analcime* is recommended as the preferred name and not *analcite*; *arsenopyrite*, not *mispickel*;

hemimorphite, not calamine; nontro-
nite, not chloropal, and siderite, not
chalybite.

The well-known textbook "Dana's
Manual of Mineralogy" revised by

C. S. Hurlbut contains descriptions of
about 200 of the most important
minerals and, at the end of each
description, the origin of the mineral
name is given where this is known.

book review

Forest Trees of Australia

by NORMAN HALL, R. D. JOHNSTON and G. M. CHIPPENDALE

(9½" x 7", 334 pp., 145 full-page plates — 13 in colour.

Aust. Govt. Public Service, Canberra, Sept. 1970. Price \$8.50.)

By some mischance, a review of this
noteworthy publication in the *Vic-
torian Naturalist* was overlooked two
years ago; but it is *so* important to the
forester, tree-specialist, conservationist,
general botanist and every lover of our
countryside that some notice — even
if belated — ought to appear in this
journal. No better value could be
imagined for a purchase price of
\$8.50.

Forest Trees of Australia, third
edition (revised and enlarged) of a
book that was first published in 1957,
is packed with information about the
principal arboreal species. Since euca-
lypts dominate almost 95% of the
forested land of the Commonwealth,
118 kinds are included in the book.
Each tree is dealt with in strict uni-
formity: there is a left-hand page of
text setting out the habit, habitat, dis-
tribution, climatic and soil preferences,
associated species, utility, morpho-
logical characters (of bark, leaves,
inflorescence, fruit and timber), any
distinctive features or variations and
an inset line-map of Australia (2½" x
2½") indicating the range of the tree in
heavy black; the facing right-hand
page is entirely illustrative, with photo-
graphs of trees *in situ* (to show crown
pattern, etc.), bark, seedling or juve-

nile or intermediate leaves, mature
leaves, buds and fruits — the last four
each accompanied by a scale in both
centimetres and inches.

It is the aim of the Forestry and
Timber Bureau in Canberra to pro-
vide, eventually, this kind of systema-
tized information not only for com-
mercial species, but for *all* indigenous
trees in the Commonwealth. Since
September 1970 Norman Hall has
been active in preparing the text and
photographic illustrations for 50 addi-
tional species of *Eucalyptus*; these
have been published, from time to
time, as separates by the Bureau under
the title, "Forest Tree Series", and
they will be incorporated without
alteration in the next edition of this
useful book. Scrupulous attention is
being given to accuracy of detail, and
annotated voucher specimens are kept
of every eucalypt (and the parts there-
of) photographed in the field. Future
checks on identity, etc., may thus be
made on the actual populations used
as illustrative material.

On pages 309-322 are separate
keys to the lumber-producing euca-
lypts of five major regions in Aus-
tralia; these are very simple but effec-
tive. The work concludes with a

four-page glossary of botanical terms and an excellent index to scientific and vernacular names. So carefully were the proofs read that it is virtually impossible to find any misprint in

text or index; one that escaped detection was "Fraser" for Flinders (Island) in line 4 of the third paragraph on page 128.

— J. H. WILLIS.

A Handbook to Plants in Victoria

Volume 2 — Dicotyledons

by J. H. WILLIS

Published by Melbourne University Press. Price—\$21.

This eagerly awaited complete record of 2,290 species of Dicotyledons — indigenous and naturalized alien plants — is the culmination of twenty-two years of work revising previous records and adding extra species discovered.

Vol. 1, dealing with Ferns and their allies, Gymnosperms and Monocotyledons with 943 species was published ten years ago. The research was sponsored by the Maud Gibson Gardens Trust, The Melbourne University Press and the Government of Victoria.

In 1888 Ferdinand Mueller wrote in the "Key to the system of Victorian plants", "This work owes its origin to a desire expressed by the Field Naturalists' Club of Victoria . . . that its members should be provided with a literary guide." This was for "1,900 vascular plants indigenous to Victoria". About forty years later the Government of Victoria requested Professor A. J. Ewart (Government Botanist) to "undertake in an honorary capacity the preparation of a new Flora of Victoria and offered to defray the cost of preparing any illustrations". This was published in 1930-1. Now just over forty years on comes this really complete work of Mr. Willis, making Ewart's flora obsolete.

This book shows how to identify the families, genera and species of indigenous and naturalized alien dicotyledon plants in Victoria. It is far

more than just a key as there is much additional information about each species. As well as the scientific name, a common name is given in each case and a previous name is also recorded. Though there are no illustrations in this book, publications in which illustrations of species may be found are named.

The distribution of each species is indicated by letters referring to lettered rectangles on a map of Victoria at each end of the book. Each rectangle extends over 1° of latitude and 1° 50' of longitude.

For a few families and genera and species the details of special localities are given as in Vol. 1.

The descriptive terms are simple and the distinguishing features of each species easy to recognize.

To appreciate the scope of revision and addition of species the following comparison may be made:

Eucalyptus: Mueller, 38 species; Ewart, 68; Willis, 96.

Acacia: Mueller, 53; Ewart, 74; Willis, 96.

On the other hand *Epacris* has 10 species in former works and there are 8 in Willis.

The ambiguous former genus *Blenodia* had 6 species now distributed between 3 genera.

Mr. Willis is internationally known and respected for his scientific integrity and thoroughness in Taxonomy

and this authentic book is a boon for Botanists, Agricultural Science and Forestry students, Conservationists, Field Naturalists and any of the increasing numbers of people interested in our native plants.

The misprint in the index on p. 778 for *A. spinescens* is unimportant.

In the introduction to this work he asks "Should field observations bring to light any extensions in the regional distribution of a particular species, the observer is invited to communicate this additional information to the National Herbarium, South Yarra."

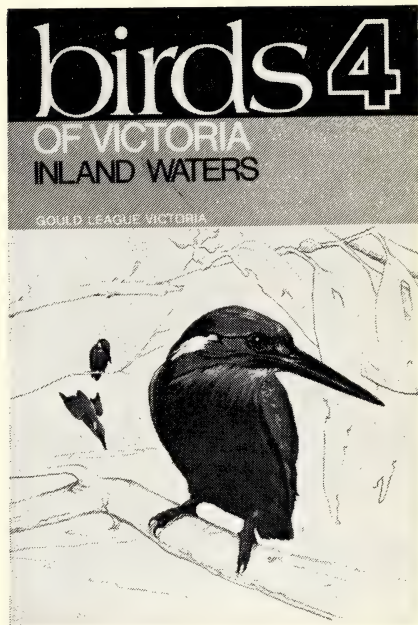
—L.M.W.

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REQUEST FOR INFORMATION

Members with reliable bird lists for the Westernport region (including Eastern Mornington Peninsula) wishing to assist in a proposed book, "The Avifauna of Westernport Bay, Victoria", are asked to forward them to William A. Davis, P.O. Box 78, West Footscray, 3012.

Information is currently being collated for a projected publication date during 1975. Pressures on the Westernport area make it highly desirable for such a book.

W. A. DAVIS.

Field Naturalists Club of Victoria

Botany Group

12 April, 1973

The subject for the evening was "Some Aspects of the New Zealand Flora" by Miss L. White and Mr Dick Morrison who showed his own slides as well as some taken by other members who had been on the trip. Miss White gave a most entertaining and informative talk, and in spite of the shortness of the trip, was able to give a great deal of information on the flora of the various places visited. She had also prepared some drawings of interesting species which it had not been possible to photograph, including several of the conifers and shrubs and trees which bear colourful fruits. Among the exhibits was an impressive collection of books and brochures on the National Parks of New Zealand.

A brief report of the Group's excursion in the Yarra Valley at Studley Park and Pound Bend was given by the leader, Mr. Ian Cameron. Some little known spots were visited and members felt they had gained a greater respect for the value of this portion of the river.

Following the discussion last month on ways of helping members with identifications and the use of a botanical key, a sheet of notes on *Goodenia ovata* was available. Mrs. M. Corrick spoke briefly on the unusual structure of the stigma which is characteristic of the family *Goodeniaceae*, and portions of the flower were displayed under the microscope. It is hoped to deal with a different flower in this way each month.

Mr. A. Fairhall reported on the Annual Meeting of the Natural Resources Conservation League which he attended as the Club's delegate and drew members attention to the Wetlands Forum which the League is organizing.

Marine Biology and Entomology Group

2 April, 1973

The meeting was attended by 24 members.

Guest speaker for the evening was Mr. J. A. Harris from the Forestry Commission, who is at present carrying out research into forest entomology. His talk was on insect pests which attack trees. One of these was *Uraba lugens*, a species of moth, the larvae of which attacks *Eucalypts*, and is a gum-leaf

skeletonizer. This species can defoliate up to 100 acres at a time. At least two species of wasps parasitize this larva which helps to reduce its depredations somewhat. The moths are poor fliers, not flying higher than eight feet from the ground. Another insect which does damage is a beetle, *Austroplatypus incompertus*. Mr. Harris outlined the history of this beetle, and the research which took place. They make galleries in the wood at a very slow pace, a three-year-old gallery being only three inches long. Trees are only attacked if they are fifteen inches or more in diameter. Smaller trees are immune. *Phasmidae* (stick insects), also do much damage. They attack narrow-leaved peppermints and red gums. Trees however re-foliate. Phasmids lay their eggs straight down into the ground and have a four-year life cycle. About 5-10 per cent hatch out. In December through to January, the females, by themselves, start a new plague. They have no known parasites or predators. Biological control is accomplished by spraying.

Exhibits.—Mr. P. Kelly: Parasitic wasps which emerged from the eggs of a beetle of Genera *Paropsis*, collected at Rushworth, Victoria.

Mr. K. Strong made a microscope slide of one of these tiny wasps, the species of which is unknown.

Also shown were — (i) COLEOPTERA: Family Carabidae; Genus *Catadromus*. (ii) Also another species of beetle, Family — Hydrophilidae; Genus *Hydrophilus*.

These two beetles were taken at Shepparton, Victoria, from street lights.

Mr. H. Bishop, showed, under his microscope, a live medusa of *Clavatella* taken at Beaumaris, Victoria. Also a Coelenterata, *Velella lata*, found on the ocean beach at Mallacoota, Victoria. Mr. Bishop said that this Coelenterata belongs to a special division known as the Disconantha.

Dr. Brian Smith showed four species of Queensland Cowries, viz., *C. caurica*, *C. erronea*, *C. subviridis* and *C. pyriiformis*. He explained that these four species were often confused. Also two shells of the family Haliotidae, *Haliotis ruber* and *Haliotis laeigata* were shown. These were taken off Torquay, Victoria. Dr. Smith explained that these shells showed possible hybridization.

Mammal Survey Group (FNCV)

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Camps.

19-20 May

9-11 June

21-22 July

25-26 August

22-23 September

20-21 October

17-18 November

8- 9 December

Letter to the Editor

On behalf of the 15 April excursionists I hope you can spare a little space to express our appreciation of the superb leadership on the geology of Melbourne.

From long knowledge of Dan McInnes we expected a very interesting day, but the trip was, in the opinion of us all, quite outstanding.

It is regrettable that we have few

such energetic and lucid leaders and that a large proportion of our excursions are little more than pleasant days in the country with little or no nature teaching.

There were many requests that Dan's clear and comprehensive notes should be published in our magazine.

L. M. BEADNELL.



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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 11 June—At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — “Botanical Trails through the British Isles”: J. H. Willis.

Monday, 9 July—(to be announced)

GROUP MEETINGS

(8 p.m. at National Herbarium unless otherwise stated)

Thursday, 14 June—Botany Group meeting.

Thursday, 21 June—Microscopical Group meeting in Prahran Town Hall Public Library rooms at 8 p.m. The group will be contributing to the Library Group Midwinter Lectures.

Thursday, 21 June—Day Group. To meet at Conference Room, National Museum, at 11.30 a.m.: Study of bird specimens. Members to bring lunch.

Thursday, 28 June—F.S.G. meeting in Conference Room, National Museum, at 8.00 p.m.—Mr. B. Dexter and Mr. Heislars, of the Forests Commission, will speak on “The effects of fires on Forests and their Inhabitants”.

Monday, 2 July—Marine Biology and Entomology Group meeting. In Conference Rooms, National Museum, at 8.00 p.m.

Wednesday, 4 July—Geology Group meeting.

CAMPS

14, 15 July—F.S.G. Acheron Way: Donna Buang.

JUNIOR F.N.C. MEETINGS

Friday, 29 June—Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 6 July—Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 13 July—Black Rock Juniors at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

—Montmorency and District in Scout Hall, Petrie Park at 8.00 p.m.

F.N.C.V. EXCURSIONS

Sunday, 17 June—Miss M. Lester will lead an excursion on ‘Ferns’ in the Sassafras Creek area. The coach will leave Batman Avenue at 9.30 a.m. Fare \$1.70. Bring a picnic lunch.

Saturday, 25 August-Friday, 7 September—This excursion includes a week at Coonabarabran, the nearest town to the Warrumbungles in N.S.W. The coach will leave Melbourne on Saturday, 25 August, stopping overnight at Finley and Parkes, and will reach Coonabarabran on Monday, 27 August. The return journey will include two nights in Canberra. It was hoped to rent some of the converted trams at the Warrumbungles; however, this was not possible, so the excursionists will be accommodated in hotels or motels on a dinner, bed and breakfast basis, but we would like members going by private car and camping to link up with the party. The cost, including transport and accommodation, should be approximately \$155 with hotel accommodation in Coonabarabran and \$15 extra in the motel. The excursion secretary would appreciate hearing from local members when planning these excursions and would be grateful for suggestions from anyone knowing the areas to be visited.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

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6 June, 1973

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Front Cover:

Tachyglossus aculeata, the Spiny Anteater, indicates his unruffled, unhurried
and admirable approach to the world about him.

photo: J. Wallis

Early Naturalist's Writings – 3

The following is a letter* written by the naturalist Amalie Dietrich to her daughter Charitas, during a visit to Australia in 1864.

Rockhampton
12/10/1864

Dear Charitas,

You may have wondered why you have heard nothing at all from me for so long, but just think, I have been very ill with a fever for six weeks: and hardly had I recovered, when my house burnt down.

Yes, I know exactly how I became ill, but how the fire broke out, that remains a mystery.

Here in the settlement they say that the Aborigines did it, but I don't think so; I don't hold with them being malicious, only crude and ill-bred.

I won't have anything said against the Aborigines, they recently saved my life. How this all came about, you shall soon hear.

Concerning the fire, I could unfortunately save nothing more than the bare essentials. Such a house, out of bamboo poles covered in palm leaves, is burnt down in an instant. The spirit preparation gave the flames new support. After the illness I was still very weak, and now, as well, came the great fright and sorrow. I lost all recollection. Ah, everything is destroyed! The paper for the Herbarium and the expensive spirit.

Before my illness I had already collected so many beautiful specimens together, that I had thought of soon sending them. Had I only done so! It worries me so, what Godeffroys will say. What if they lose their faith in me? If they call me back now? Ah, this last piece of mis-fortune has quite cast me down.

I am fearful, faint, shaky in the legs, so that as I am now, I could do

nothing, even if I had the material to work with.

I am for the present, homeless. The German squatter family took me in with them in the first place, I feel so unfortunate and dispirited. I sit lazily around. I can't go far yet. Without spirit and paper I can't do anything, and to have the living animals around me for so long, until I am better, is also out of the question: such people have no understanding of my interests, they don't like it when I have snakes and lizards in my room. I really can't demand that, just must be glad they put up with me.

Ah, I am terribly impatient. It tortures me day and night, that I can hear nothing from Godeffroys. I feel this long delay in my daily activity to be a very difficult fate.

My illness came in this manner:—

One day I made a tour into the huge plains where thousands of sheep and cattle graze.

The impression is peculiar—far plains stretch themselves in unseeable distances, here and there the monotony is broken by giant trees, upon which further parasites have settled themselves; parasites whose roots hang down from giddy heights like a tangle of thick ropes. These sorts of tree-parasites clutch firmly in the crown of the tree and suck their landlord's sap and life, until he is finally brought to the ground. That is a sad moment.

* Translation from the German language by Diana Dennis under supervision of Gertrude Mulac-Teichmann. Last article: *The Victorian Naturalist* 81 (1) May 1964.

One can wander these plains hour-long without getting any other impressions. The horizon rises and sinks imperceptibly; in the lowlands water collects and swamps develop, in which beautiful water plants grow. These plants are visited by the most beautiful insects.

At the time I wanted to collect samples of grass and rushes, which mostly grow so high, that I quite disappear amongst them. Through that I lost my survey of the scene and I presently noted that I had got into a swamp.

"Now, as one gets into it — so one gets out of it again" I thought. I had dealt with many swamps in my life. Yes, if I had only turned around at once, everything would have been alright, but some distance away there shone a fine blue water lily. I had to have it! Carelessly and without worrying about the apparent mirror-like surface of the water, I plunged in. Yes, I got it, but O God, at what a price. I wanted to turn around, but there was no way back. Deeper and deeper I sank. As soon as I moved, the water climbed higher. What should become of me in this great solitude. It became later and later. There was no sound of human activity from near or far, only the giant eucalyptus rose on one side in certain distances on the plain, while before, on the other side of the swamp, lay a dark forest.

I listened tensely. Many swamp-birds, also the Kookaburra, which formerly had made so much fun of me, let their voices be heard, whilst near me countless frogs croaked. No human voice. "Ha Ha Ha!" called the Kookaburra. Had he spotted me? "Ha Ha Ha! Ha Ha Ha!" Yet again this scornful laughter.

A dreadful worry possessed me, especially as now white fog lay around me and enveloped the entire region.

I don't fear easily but then I feared for myself.

Although I knew that my calls did nothing to help, yet I called full of anxiety into the loneliness; perhaps God had a rescuer nearby. Ah, how anxiously I listened after each call, how I spied for humans. Cold shivers ran through my body — I almost lost my senses from worry.

Presently I saw in the distance through the fog, a red light in the forest and at the same time I heard a wild noise. I thought: In these days it must be full moon and then the Aborigines meet to dance. I had not seen it, but in the settlement they had described it to me. Oh, if only I could succeed in attracting their attention.

I cried out with all my strength for help; I said to myself, if they don't understand the word, if only I can awaken their curiosity. Indeed, it presently became still out there, and I saw, coming towards me through the trees, flickering fire lights. I called louder and more urgently in order to guide them in the right direction, because it had in the meantime grown quite dark. But — what was that? Had they changed their minds? Did they turn away? — They stood still and I could hear excited speech amongst them. Did they fear me? What else could I do other than call? After some time — to me it seemed endless — the fire lights and the wild voices drew nearer. I was terribly excited. At last I could see, as an entire tribe of Aborigines, men and women, worked their way towards me through high grass and reeds. They pushed and shoved a narrow canoe towards me as they neared me; letting out wild howls and swinging their fire brands and with grinning faces they pulled me out of the swamp, set me in the canoe and we departed. That the canoe lay so deep in the water

they appeared not to mind; it was a colourful bustle—one helped the other. In any case I was saved.

They brought me to the house of a squatter family and doubtlessly afterwards continued with their dance by the light of the full moon.

The whole thing was like a wild dream. The long stay in the water and the fearful anxiety had their results. I became very sick, became feverish. I was brought to my station in the ox wagon. The woman from whom I get milk and anything else I need, wanted me to stay with her in order that I would not be so alone. However I did not want that—nothing is more painful than to be a burden on another.

The woman looked in on me however, cooked me soup occasionally and daily sent her daughter Lucy, who placed a can of milk on the trunk next to my bed; and then came my cat, sat at my feet, and I shared the milk with her.

I cured myself with my dispensary which I take with me, using particularly Quinine. You see, I am fairly well over the illness, but I have done nothing for six weeks and now I must meet the misfortune of the fire. If only I had sent off what I had ready.

Yes, I must tell you about my cat, she deserves it. You know I love to have animals around me. I observe them with interest, they are such fun, and if they want it, I teach them all sorts of things. My cat is not only very faithful, she is also very clever. She accompanies me for a bit, climbs up myrtles and rubber trees and hunts for her profit, but funnily enough, she also collects for me. It is quite touching what she drags to me, frogs, toads, lizards and those sorts of things. The small mammals and birds she keeps for me. According to her nature she prefers to collect at night. I however prefer to sleep; now she

makes a noise for so long, until I get up and let her in. That did not suit me so I left the door open a crack. If she now has anything she lays it before my bed, jumps onto me and wakes me up very gently. I must light the light and take up the booty. That she choose the animals, that much I could not teach her, so she brings me mostly familiar small stuff. I give the animals the freedom and Pussy collects indefatigably, freely disturbing my sleep, but I would not hurt her.

I received your letter from Eisenach and am very pleased that you are getting along so well there. But I do wonder very much over you! Can you still not distinguish the great from the insignificant? You are still a superficial lover of finery. On reading your story of the parasol I had to think so much of your Aunt Leanka in Bukarest. If you had laid your worries before her, then you would have found understanding. Do you expect it from me? You don't know me very well. You spend the whole day travelling through strange, beautiful districts. They are paraded before your eyes; you need not at any time exert yourself, only gaze out and you shall receive, but you weigh down your soul with small things. "Soul, why do you weary yourself?" Why does one learn something like this when one does not use it?

I am naturally of Frau Doktor's opinion. One lives in a hostile world. If I had been better prepared in my youth for the struggle, I would not have suffered so. I am very anxious what your next letter will tell me.

I hope I soon get material and my old strength, in order that I can again collect efficiently.

Be brave, and write to me again so fully.

I embrace and kiss you,
Your loving mother.

book review

Flora of the Sydney Region

By N. C. W. BEADLE, O. D. EVANS, R. C. CAROLIN and MARY D. TINDALE

9½" x 6". 724 pp., 16 plates — 8 in colour, 56 figs.

Publ. A. H. & A. W. Reed, Nov. 1972. Price \$13.95.

This most welcome taxonomic handbook, by four leading professional botanists in New South Wales, has recently reached the library of the Field Naturalists Club of Victoria. It supersedes the very useful but considerably smaller *Handbook to the Vascular Plants of Sydney District and the Blue Mountains* (by the same authors in 1962), a private publication which has been out of print for several years. The present title is somewhat misleadingly restrictive, because the book incorporates all species of vascular plants occurring between the rivers Hunter and Shoalhaven (well north and south of Sydney), with the Dividing Range as approximate boundary to the west — "a floristic unit known as the Central Coast" and an adumbration, perhaps, of the suburban sprawl of Sydney within the next century or so. The numbers of species cited in the Preface for this large tract (covering six counties) are about 2,000 indigenous and 450 introduced aliens; a careful count of those actually described on succeeding pages has disclosed 2,050 native and 586 adventive species, and these figures approach half the total vascular flora of New South Wales. There are as many ferns (115 spp.) and orchids (180 spp.) here as in the whole of Victoria!

Flora of the Sydney Region is undoubtedly a splendid achievement, meriting high praise for the joint authors and the publishers, A. H. & A. W. Reed, from whom one has grown accustomed to expect such a standard of production. Material is excellently and spaciously set out,

and the book is further enhanced by 16 plates of superior clarity (half being in colour) in addition to 56 figures of line drawings. It will surely take its place as one of the most important regional floras yet produced in the Commonwealth — a fitting companion volume to Burbidge's & Gray's *Flora of the Australian Capital Territory* (1970).

The very comprehensive glossary of botanical terms and the line drawings of leaf-shapes, inflorescences, floral organs, fruits, etc., on pages 13-36 follow the same pattern as in the earlier handbook and are most useful to those with a limited knowledge of taxonomy; but it seems a pity that the Introduction (of 8 pages in the previous volume) has been omitted altogether. Except for a few additional items, the general key to angiospermous families (pp. 99-113) remains almost exactly as before, yet the supplementary key for field use (pp. 117-146) has been completely re-cast.

Some keys under genera are unaltered from 1962, whereas many others have been re-written. The section on *Eucalyptus* (contributed by Professor Noel C. W. Beadle) has received special treatment, with much extended descriptive text against each species. An innovation here is the insertion of clear marginal illustrations of eucalypt buds and fruits, by Miss Lois D. Beadle, for all 101 species recognized — particularly helpful in such a large perplexing genus. The key to the groupings of eucalypts on p. 314 is based chiefly upon bark features, and it could be difficult to identify a hand specimen without

some foreknowledge of the living tree from which the sample came. The reviewer has found it impossible to key out a peppermint or stringybark eucalypt from first principles, by commencing at the key to *Angiospermae* on p. 99. This would lead one to key division E on p. 100 ("either, petals connate; or perianth-segments connate and arranged in a single whorl"), from which we pass to Group 13 on p. 109, but key division F ("calyx and corolla present") does not fit any eucalypt of the section *Renantherae*. Nor can the genus be tracked down by using the special field key on p. 118—but perhaps such a criticism is mere "straw-splitting", and surely every Australian, plantsman or otherwise, would recognise a gum-tree on sight and not require to work out its family first!

Descriptions of families and genera in the fern flora are much more detailed than for any others in this book. Distribution of each fern and club-moss is given for other Australian States, also beyond the Commonwealth; but no such information accompanies any gymnosperm or angiosperm species.

The locality and habitat notes against all species are quite useful, and it is a good idea to have incorporated major synonyms in the Index (pp. 689-724), with cross-reference to the accepted name in each case, rather than clutter up the text. Families in the Index are effectively picked out in bold black type. One is rather puzzled by the arrangement adopted for angiosperm families, which follow neither the Hookerian (and Benthamian) nor Englerian system, and no explanation appears to be offered. *Myrtaceae* and *Casuarinaceae*, for instance, are oddly assorted bedfellows to be placed together on p. 352. While it is admitted that the delimitation of taxa can be highly subjective, one wonders why

Cassytha is given familial rank distinct from *Lauraceae* on p. 152, but not so *Cuscuta* (p. 494) which is equally if not more distinct from all other members of the family *Convolvulaceae*.

Typographical slips that were not picked up at the page-proof stage are surprisingly few, in the 688 pages up to the Index; but here follows a list of those detected during a cursory thumbing of the book:

- Page
 103—EUPHORBICAEÆ (= EUPHORBIACEÆ)
 109—EPARCIDACEÆ (= EPACRIDACEÆ)
 111 (line 2) — whrol (= whorl)
 282—*Oxylobium pultenae*
 (= *O. pultenæ*)
 357—PARIETERIA (= PARIETARIA)
 383—EUOIDA (= EUODIA)
 383—*Acronychia oblongifolia* & *A. simplicifolia* (= *A. oblongifolia* & *A. simplicifolia* resp.)
 388—CARDIOSPERMUM
 (= CARDIOSPERMUM)
 391—*Polyscias sambucifolia*
 (= *P. sambucifolius*)
 466—*Senecio asparagiæfolius*
 (= *S. asparagiifolius*)
 469—*Chrysanthemoides moniliferum*
 (= *C. monilifera*)
 496—*Verbascum thapsus* (= *V. thapsus*)
 532—ARTHROPOIDIUM
 (= ARTHROPOIDIUM)
 597—CYATOCHEATA (= CYATHOCHÆTA)
 653 & 654—*Deyeuxia brachyanthera*
 (= *D. brachyathera*)

The situation, however, is not nearly so bright in the 36 pages of Index, where at least 106 mistakes, chiefly in spelling, have been counted—an average of three errors per page. [A list of these errata (with corrigenda) is available from the reviewer, if desired.] It would seem that, in order to up-date the text, several nomenclatural alterations were made at the eleventh hour without any corresponding final and careful check of the index, otherwise it is difficult to understand how the following discrepancies could have occurred:

Microstobos is the spelling adopted in two places on p. 97 of text, but

the rendering in index (p. 710) is "*Microstrobos*".

Petrorhagia nanteuilii in text (p. 177), but given as *P. prolifera* in index (p. 714).

Rumex acetosella in text (p. 184), but *R. angiocarpa* in index (p. 718).

Lilaeopsis polyantha in text (p. 395), but *L. australasica* in index (p. 708).

Notelea is the spelling in text (pp. 414 & 415), but "*Notolæa*" in index (p. 712) — the correct rendering should be *Noteleæa*.

Misopates in text (p. 496), but "*Misapetes*" in index (p. 711).

Erythræa centaurium appears as a synonymous name in index (p. 701), where there is a cross-reference to the accepted name *Centaurium minus*, but the latter is not to be found on p. 696 of index nor on p. 421 of text.

Similarly, *Erechtites arguta* (index p. 701) is referred to p. 468 of text where there is no mention of it whatever.

Hypolæna lateriflora (index p. 706) is listed as a synonym of *Calorophus lateriflorus*, but the latter is itself synonymized under *C. minor* on p. 695.

There is some inconsistency in citation of authorities for names, e.g., we have "N. A. Wakef" on p. 44, "N. A. Wakefield" or simply "Wakefield" both on p. 365 and "N. Wakefield" on p. 708 (lines 1 & 7); under *Orchidaceæ*, pp. 563-586, R. D. FitzGerald's name is abbreviated throughout as "FitzG.", but in the index it is invariably rendered "Fitzg." (see *Caladenia* p. 694, *Prasophyllum* p. 716, etc.). Also, the asterisk for introduced plants is not always correctly applied; for instance, there are no prefixing asterisks against the two *Petrorhagia* species (p. 177), *Solanum sodomæum* (p. 489) and several other undoubted weeds of alien origin, whereas the truly indigenous and endemic *Celmisia longifolia* is wrongly asterisked (p.

456). It is to be regretted that all these imperfections were not discovered in time to be eliminated, or at least to be included on the 'errata' slip that accompanies this volume.

In several instances, invalid and obsolete names have been retained. Two such are *Hybanthus filiformis* (DC.) F. Muell. (on p. 168) which should be replaced by *H. monopetalus* (Roem. & Schult.) Domin; and *Leucopogon hookeri* Sond. [not "F. Muell."] which must become *L. suaveolens* Hook. f. (p. 406). The authority for *Hydrocotyle peduncularis* (pp. 394 & 706) is not N. A. Wakefield, as cited, but R. Br. ex A. Rich. There seems to be some mistake in identification of the photograph at the lower right-hand side of plate 13 (opp. page 576) purporting to be *Melaleuca ericifolia* — it fails to show the narrow-linear leaves and very short staminal claws (only 1.5-2.0 mm long) ascribed to this species in the description on p. 347.

One queries the recording of Bird's Nest Fern, *Asplenium nidus*, for Victoria (p. 83). This handsome plant was not admitted in either of the two handbooks on Victorian ferns published by the F.N.C.V. (R. W. Bond's in 1934 and N. A. Wakefield's in 1955), and intensive searching for it in the Howe Ranges and other likely parts of far East Gippsland, during the past 40 years, has been to no avail; it is certainly not considered indigenous to this State.

A final interesting point concerns use of the word "Grounsel" (pp. 467, 468 & 704) for certain species of *Senecio*. This curious spelling was employed also in the previous handbook of 1962, but one is at a loss to find any alternative spelling for the usual Groundsel either in the Oxford Dictionary, the various British floras or other botanical works of reference.

—J. H. WILLIS

Ayers Rock, Northern Territory Australia

by DR. A. W. BEASLEY*

It is only 100 years since the first white man visited Ayers Rock. This was the explorer W. C. Gosse, who named the mountain after Sir Henry Ayers, the South Australian Premier at that time. Today Ayers Rock is an outstanding tourist attraction, and it has a strong fascination for most people who visit it.

Ayers Rock is a huge domed rock-mass, 2,820 feet high and approximately $5\frac{1}{2}$ miles in circumference, situated about 200 miles south-west of Alice Springs in the Northern Territory. It rises abruptly from the surrounding plain, reaching a height of 1,140 feet above the level of the sandy plain. The lower slopes are steep and precipitous and vertically furrowed into great buttresses, but the upper slopes are gentler and the top is flattish.

Ayers Rock is composed of near-vertical beds of arkose, a type of sandstone with a high feldspar content. The bedding is particularly conspicuous when the Rock is viewed from the air. On its top there are parallel ridges and furrows produced by erosion along the bedding planes, and weathering along the steeply tilted bedding planes is also responsible for the fluting which marks the lateral buttresses, especially on the northern side.

The Ayers Rock arkose is a non-marine sediment deposited in front of a mountain chain formed by folding and thrusting during a period of major earth movements known as the Petermann Ranges Orogeny. This orogeny is believed to have occurred

in late Upper Proterozoic times and the arkose is thought to be of early Cambrian age, the detrital material coming from the rapid disintegration of granite and gneiss exposed to the south-west. The arkosic sediments are considered to be of fluvial and deltaic origin, laid down about 550 million years ago by rivers that emptied into a sea to the north-east. Subsequent earth movements uplifted the beds of arkose and tilted them almost vertically. Unfortunately, no fossils have been found in the rock.

The weathered surface of the arkose is indurated, relatively smooth, and reddish brown in colour. However, when the rock is broken and a fresh surface is examined, it is generally pinkish to greenish grey in colour. Examination reveals that the arkose is coarse-grained with rare bands of conglomerate and some medium-grained laminae, and that it contains fragments of feldspar up to one inch long. It is cross-laminated and poorly sorted, and most of the grains are sub-angular.

Although the arkose is fairly resistant, Ayers Rock has been eroded considerably through the effects of rain, wind and temperature changes. The smooth outline is largely the result of a weathering process known as spalling. This affects rock which is of a homogeneous nature and which has very widely spaced joint planes. Actually, rock fractures called joints are conspicuously absent in Ayers Rock, and bedding plane fissility is absent. The dominant weathering process appears to be the spalling or

*National Museum of Victoria.

"peeling" off the rock surface of slightly curved slabs of rock averaging about one inch in thickness and one foot across; this tends to create a smooth, curved surface.

On the north-western face, weathering has produced a spectacular feature known as the "Kangaroo Tail". This is a huge outwardly-curved strip-like slab of rock about 20 feet thick lying on a 50-degree slope, separated from the main rock surface for most of its length of 200 feet by a crevice four feet in width. The slab is about 15 feet in width and is attached to the main rock mass at its top and bottom.

Weathering has formed small caves in many parts of the Rock, and some of these have coalesced to form large caves up to 200 feet high and extending up to 100 feet into the rock. Chemical weathering produces a strong outer crust on the rock, but the rock below becomes weaker and it disintegrates more rapidly. Strong winds help to form the caves by removing

particles of rock detached by the physical and chemical weathering. The caves are numerous near the base of the Rock. At ground level they take the form of overhanging cylindrical rock shelters, whose long axes are parallel to the face of the rock; many of these caves are decorated with Aboriginal paintings. Caves are also common in a zone about 50 or 60 feet above the plain level; this zone may mark a former ground surface, the caves having been initiated by ground-level weathering. Other caves seem to have a quite irregular distribution. Cavernous weathering is pronounced on the northern face of the Rock and, near the north-east corner, has produced a prominent feature known as "The Brain", which somewhat resembles a vertical section through the human brain with the jaw-bone attached. It is a coalescing mass of caves which follow the bedding.

To the Aborigines Ayers Rock is sacred, and no Aboriginal would set

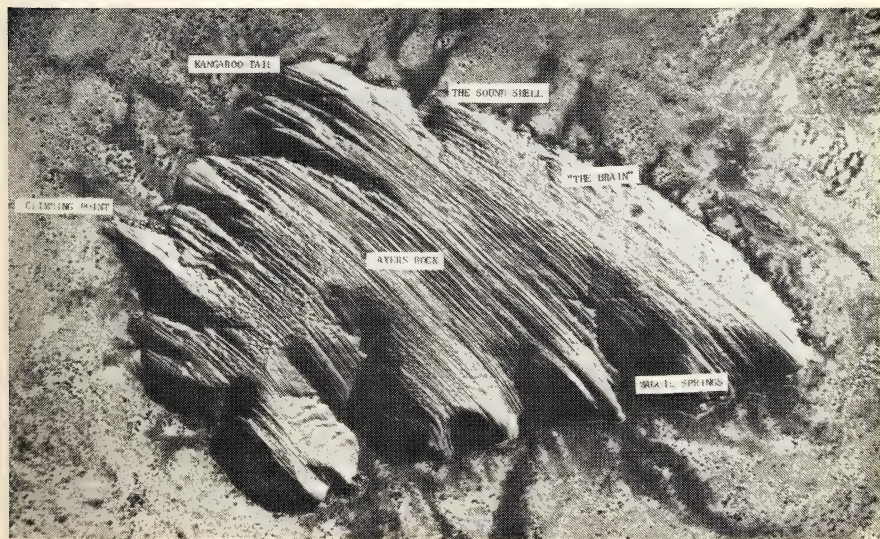


Plate 1 Ayers Rock, Northern Territory, seen from the air.

foot on the Rock itself. This explains why paintings are found only in the caves at the base of the Rock. However, many people who make the journey to Ayers Rock want to climb it. It can be climbed from a point on the western side, where a buttress slopes down at a rather gentler grade than elsewhere. Although the steepest part of the climb is at an angle of 60 degrees, it is not hazardous and, even if the climbing is carried out in a leisurely manner, it takes no longer than 1½ hours. On the top, some of the furrows in the rock are fairly deep, and these become filled with water after heavy rain. A certain amount of vegetation, including mulga and black wattle has succeeded in establishing itself on the top.

Permanent water and seepages are found at the base of Ayers Rock. On the southern side a pool is fed by a

particularly copious drainage, and is known as Maggie Springs. On the northern and western sides there are two other important pools.

Ayers Rock has been formed through the erosion of surrounding material, leaving the mountain (technically known as an inselberg) standing as a remnant of hard rock rising above the general erosion surface. It has been formed by weathering followed by removal of debris in such a way that the slopes retreated whilst maintaining a more or less constant angle. The outline is apparently determined by major joints.

Knowledge of its geology and geomorphology adds considerably to a visit to Ayers Rock. The information may also interest those who are unable to make the journey to view this spectacular feature.

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Physiographic Changes at Mud Islands,

Port Phillip Bay

by E. C. F. BIRD*

The southern part of Port Phillip Bay (Fig. 1) is underlain by a broad platform of Quaternary rocks and sediments, crossed by deeper channels which converge towards the outlet to Bass Strait. At low tide extensive shoals are exposed, notably on Great Sand, between Symonds Channel and the South Channel. Mud Islands, situated here, consist of ridges of shelly sand that rise above high tide level, and are surmounted by dunes up to 12 feet high; they enclose salt marshes and extensive shallow lagoons which are linked to the sea through narrow tidal channels at North Inlet and South Inlet (Fig. 2).

Mud Islands have long been recognised as a site of scientific interest. In 1898, part of the area became a sanctuary to preserve breeding colonies of the white-faced storm petrel (*Pelagodroma marina*); in 1930, Mud Islands were declared a Sanctuary for Native Birds and Animals, and in June 1961 they were proclaimed a State Wildlife Reserve under the management of the Department of Fisheries and Wildlife.

The physiography of Mud Islands was described by Keble (1947). They are composed of ridges of quartz and carbonate sand derived from the Quaternary aeolian calcarenite formation which extends beneath this part of Port Phillip Bay, together with shells and shell grit produced by organisms that inhabit the surrounding shallows. The ridges of shelly sand have been built up by wave and wind action to enclose a sheltered lagoon environment within which muddy sediment has been deposited. The fine-grained

sediment has come as silt and clay in suspension in the waters of Port Phillip Bay, supplied from the Yarra, the Werribee, and other in-flowing rivers and creeks. It is mixed with organic materials produced by the plants and animals that live on Mud Islands, and has been trapped and stabilised in areas colonised by salt marsh vegetation.

This article is concerned with the evidence for changes in the configuration of Mud Islands in historical times.

Historical Evidence

Acting-Lieutenant John Murray sighted Mud Islands during his exploration of Port Phillip Bay in H.M.S. *Lady Nelson* during February 1802; he sketched them in on his chart, named them Swan Isles, but did not actually survey them (Keble 1947). During the episode of Collins' settlement at Sullivan's Bay, near Sorrento, in 1803-4 they were known as Signet Island, but no detailed survey was made until 1836, when Lieutenants Symonds and Henry from H.M.S. *Rattlesnake* recorded the outlines of three islands rising above a sandy shoal that dried at low water, and gave them their present name, Mud Islands (Fig. 3, A). These outlines were entered on the chart of the Entrance to Port Phillip compiled by Commander Ross in 1859-60, but when the chart of Port Phillip Bay compiled by Commander Cox was published five years later he included on it his own survey of Mud Islands, made in 1864 (Fig. 3, B). This per-

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sisted on successive editions of nautical charts published in the nineteenth century, until it was replaced by the survey of Mud Islands made by J. B. Mason in 1896 (Fig. 3, C). A further survey of Mud Islands by J. P. Larkin in 1932 (Fig. 3, D) has been used on subsequent charts, up to and including the most recent of the Entrance to Port Phillip Bay, published with metric soundings in 1972. However, a map made by R. A. Keble in 1946 (Fig. 3, E) differs in several respects from Larkin's survey, and more recent air photographs (Plates 1 and 2) show that the outline of Mud Islands appearing on current nautical charts needs correcting (cf. Fig. 2).

It is always difficult to decide how far chart variations such as those shown in Fig. 3 represent actual changes in configuration rather than differences in the method of charting. Nautical charts are kept accurate for navigation areas, but features at and above high tide level are of less importance to mariners, and may not be

rendered so accurately. Before attempting to measure changes in low-lying coastal terrain from the evidence on historical maps and charts it is necessary to know precisely what the lines drawn on the map indicated.

The outline of Mud Islands changes continually as tides rise and fall. Boundaries mapped at different stages of the tide (e.g. highest spring tides, mean high spring or neap tides, mean tide level, mean low neap or spring tides, or lowest spring tides) would vary considerably. The vertical range between highest and lowest spring tides in this part of Port Phillip Bay is about 1.75 metres (5.6 feet), and on the very gently shelving topography around Mud Islands there is a great contrast in the area above water at highest and lowest spring tides. At highest spring tides only the dune ridges stand above the sea, whereas at lowest spring tides extensive surrounding sandy shoals are exposed (the dotted area on Fig. 1). Comparison of one survey showing

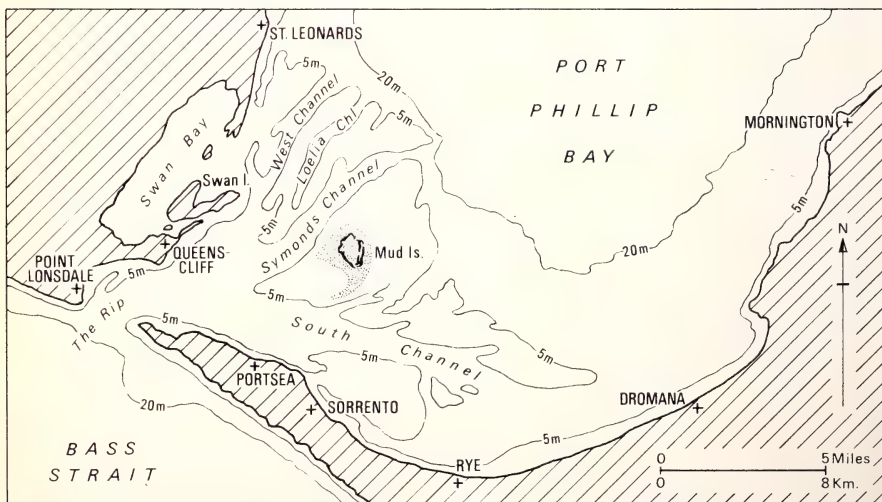


Figure 1

MUD ISLANDS

FEBRUARY 1973

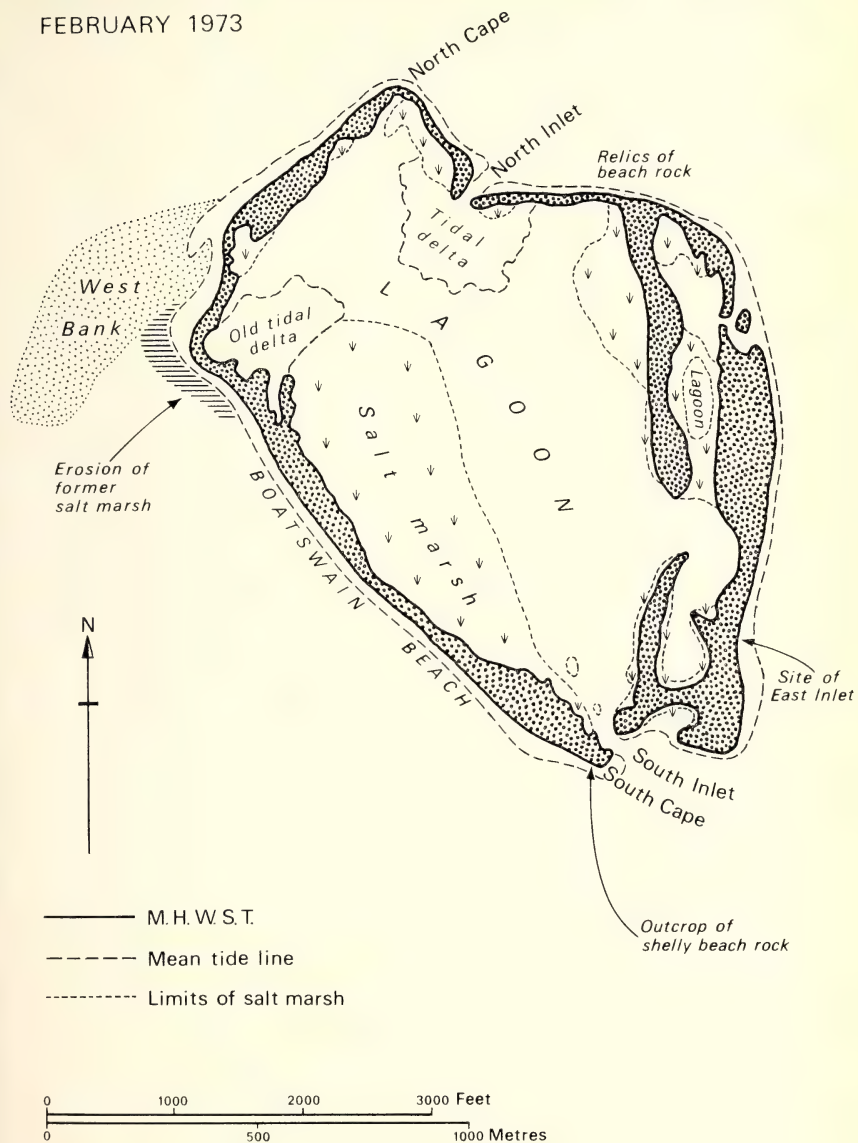


Figure 2

the outline at highest spring tides with another at, say, high neap tides might lead an unwary observer to think that an enlargement of the land area had occurred when in fact no change had taken place.

In practice, a surveyor is likely to have selected a particular level, such as the limit of a preceding high tide marked by litter and driftwood, as a mappable outline. Alternatively, since such a line is obviously transitory, he might use well-defined natural boundaries, such as a break of slope along a beach or the junction between sandy and muddy surface deposits. Vegetation often provides sharp natural boundaries in salt marsh and dune areas, and these are prominent on vertical air photographs (especially colour photographs), which also record configuration at a particular time and tidal stage. However, there is

still scope for differing interpretation of patterns as perceived by different people, and there is no certainty that maps produced independently from the same air photograph of an area such as Mud Islands will be identical.

Acknowledging these difficulties, the series of maps shown in Fig. 3 suggests that there have been variations in the configuration of Mud Islands between 1836 and 1946. The southernmost point, marked by an outcrop of shelly beach rock, and the spatulate marshland of Boatswain's Island changed little, but the western island lengthened and gained terminal recurves. Larkin's survey foreshadowed the development of a ridge along the south-western shore, but there was still a distinct outer lagoon, in the lee of Western Island, in 1946. Variations in the pattern of shoals surrounding Mud Islands are indicated,

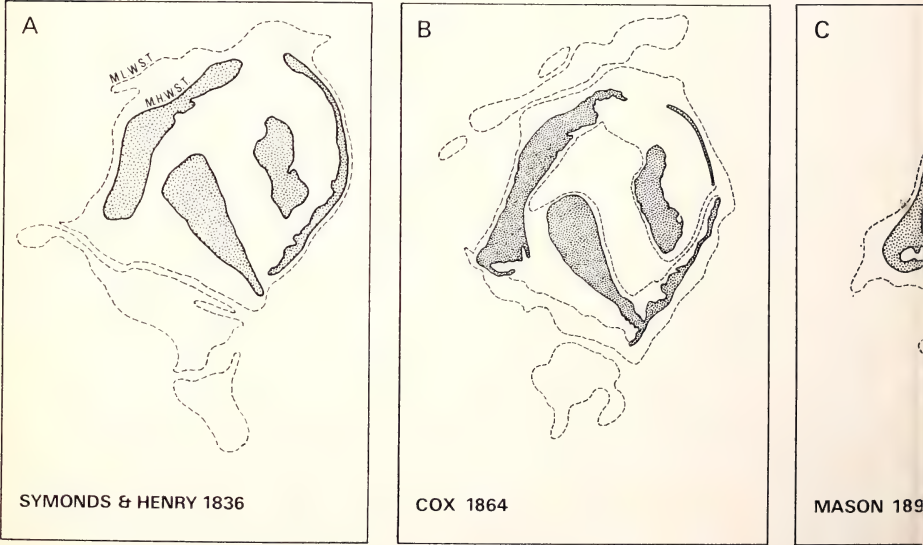


Figure 3

those to the south and west having been more extensive than those off the eastern shore.

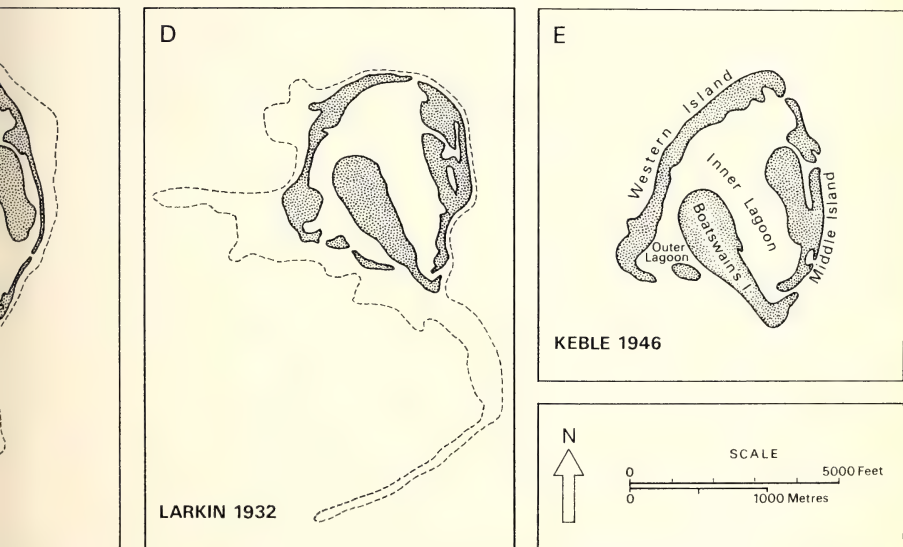
Changes Since 1951

The air photograph taken in October 1951 (Plate 1) shows that Western Island had been truncated, and that the sandy ridge along the south-western shore had been built up since Keble made his survey in 1946. Comparison with the air photograph taken in February 1969 (Plate 2) shows that the sandy ridge along the south-western shore has been driven landward and banked as a beach against the margin of Boatswain's Island. A breach had developed at some stage near its northern end, with sand washed into the lagoon as a "tidal delta" north-west of Boatswain's Island, but by 1969 this gap had been sealed off by a sand ridge. The northern shore has also been driven back,

and an in-washed sandy tidal delta formed inside a broader North Inlet. Some of these changes may have been gradual, but episodes of rapid change have occurred during severe storms. For example, extensive shore-line recession was reported as a result of the storm of 27 September 1962 by the Fisheries and Wildlife officer, Mr. Puffitt, who found that waves had washed right over the low-lying parts of Mud Islands.

There has also been recession on the eastern shoreline between 1951 and 1969, with sand deposition around East Inlet. By February 1973 this Inlet had been sealed off completely (Fig. 2). Scrub vegetation, mainly *Atriplex*, had by 1969 spread over many areas that were bare sand, or very sparsely vegetated, in 1951.

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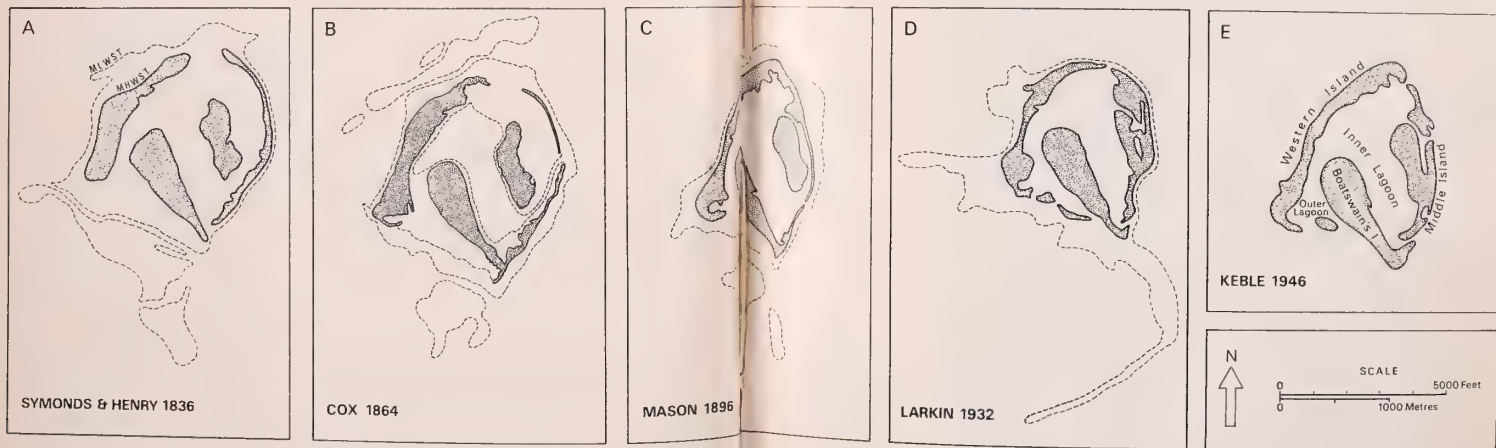


Figure 3

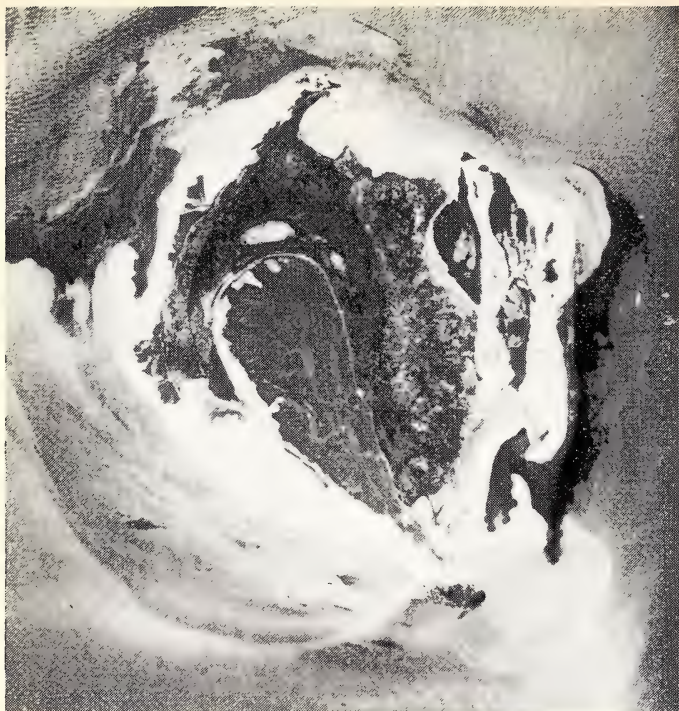


Plate 1

Mud Islands in
October 1951.
By Courtesy
of RAAF

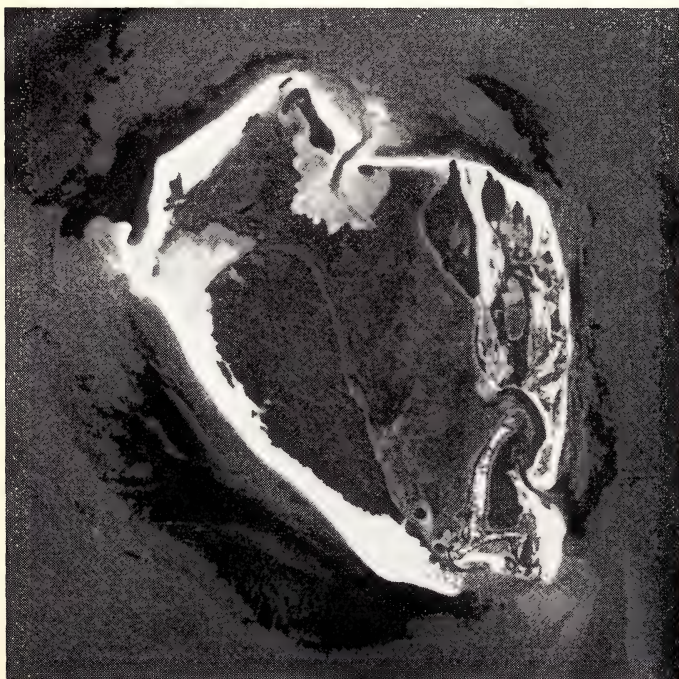


Plate 2

Mud Islands in
February 1969.
Crown (State of
Victoria)
Copyright

Western Island as a firm sand shoal (West Bank on Fig. 2), while relics of the salt marsh that once existed in its shelter can be seen as eroding mud-flats on the foreshore, with relics of the trunks and roots of a former *Arthrocnemum* scrub (Plate 3). Driftwood piled on the shore near North Cape is all that remains of a formerly dense dune scrub that occupied the eroded sand ridge; *Leucopogon parviflorus*, once common, is now represented by only a single surviving shrub.

There have also been changes in the inter-tidal zone since 1951. The sand shoal south and west of Mud Islands acquired extensive weed growth (dark area in Plate 2) by 1969, and was re-shaped off South Inlet. Since the 1969 photograph was taken sand shoals have grown northwards off the eastern shoreline to form a linear bank that may presage the emergence of a third sand ridge parallel to the two that form the inner part of the existing structure.

Discussion

The only fixed point on the shoreline of Mud Islands has been South Cape, where shelly beach rock outcrops on the foreshore (Plate 4) and extends under the highest and most stable dunes. This rests upon Pleistocene aeolian calcarenite similar to that of the Nepean Peninsula and Point Lonsdale, but the beach rock (Plate 5) results from cementation of shelly sands similar to those of the present beach. Samples of the sandy matrix were found to contain between 45 and 54 per cent of acid-soluble carbonates, the residues being mainly fine to medium quartz sand. It is possible that cementation was facilitated by the former presence of a capping of guano deposits, a foot or two thick, which were removed under leases granted during the nineteenth century. Beach rock of this type is common on calcareous beaches in warmer latitudes (Russell and McIntire 1965) but on the Victorian coast is usually found only in the presence of some



Plate 3

Photo:
E. C. F. Bird.



Plate 4

Photo:
K. G. Boston.

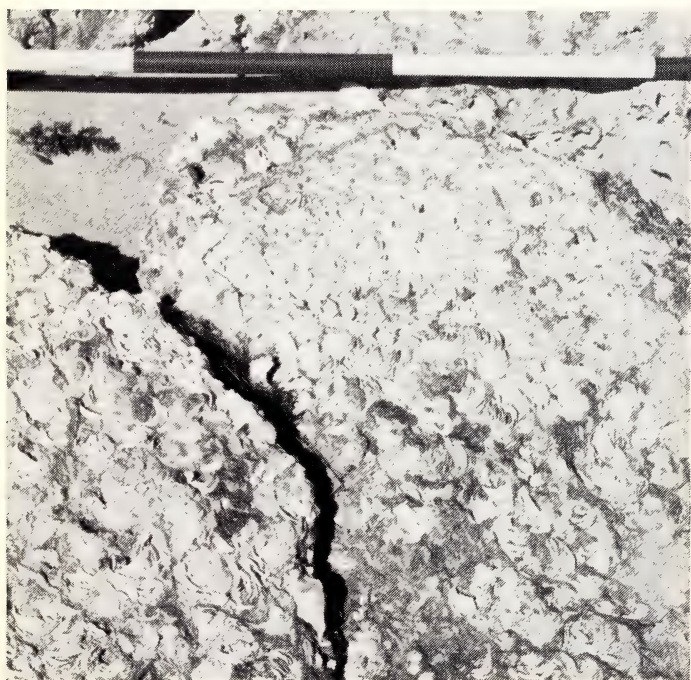


Plate 5

Photo:
K. G. Boston.

locally abundant source of cementing carbonate, such as springs seeping from a limestone cliff.

Anchored at the southern end by beach rock, the sandy ridges that enclose the lagoons and salt marshes on Mud Islands are in many ways similar to spits, shaped in response to wave action, especially during storms. Such changes can be the outcome of variations in the topography of the surrounding inter-tidal and submerged areas, where shoals and channels migrate in response to tidal currents as well as wave action. If the near-shore area is shallowed by sand accumulation, wave action reaching the beach is reduced, and shoreward movement of sand may build up the beach face; if the nearshore area deepens as the result of scour, the beach is exposed to stronger wave action, and may be eroded, or driven back by storm overwash.

On a larger scale, the changes at Mud Islands may result from changes elsewhere in the southern part of Port Phillip Bay. Early in the present century, rocks were blasted from the sea floor in the entrance to Port Phillip Bay in order to deepen the waterway for navigation (Grant and Thiele 1902). Modification of wave and tide regimes by this operation could be responsible for the extent of shoreline erosion near Point Lonsdale in subsequent decades, and indirectly for some of the changes that have ensued on Swan Island and at Mud Islands.

In general configuration Mud Islands have been likened to a coral atoll, but a closer analogy would be the low sand and shingle islands that develop on coral platforms in the coastal waters off north-east Queensland. Low Isles, off Port Douglas, is a good example, where ridges of coral sand and shingle have been built up

on a reef platform to enclose a lagoon with a mangrove swamp. Great Sand provides a foundation similar to a large reef platform, and Mud Islands have developed near its centre. Other shoals in the southern part of Port Phillip Bay have evidently been too small or too narrow to provide an environment for this kind of deposition.

Mud Islands came into existence during Holocene times, when the sea rose to submerge the Pleistocene aeolian calcarenite topography in the southern part of Port Phillip Bay. The framework of enclosing sand ridges developed as the result of wave action on unconsolidated surface deposits as these became submerged. Localised cementation of shelly beach sands has provided small areas of relatively durable rock, but within historic times there have been changes in configuration leading to the present relatively simple outline. Shelly organisms in the surrounding shallows continue to yield material for beach accumulation, and it is likely that further growth and evolution of Mud Islands will occur in the future.

ACKNOWLEDGEMENTS

I am grateful to Mrs. M. Barson, who made a diligent search for historical maps and charts, assisted by officers of the Lands Department and the Ports and Harbors Branch, and to the Department of Fisheries and Wildlife, who enabled me to visit and study the Mud Islands State Wildlife Reserve.

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FNCV Excursion to New Zealand, 1973

For the first time in the records of the F.N.C.V. an official trip was made by members to New Zealand. In three weeks over 3,300 miles were covered, giving a fairly full picture of the scenic, botanical and geological variations which occur in both islands. In an account such as this it is impossible to include full species lists because many different habitats were visited and time did not allow a systematic investigation. This report will be limited to the main points of interest encountered on the excursion.

From Wellington the group began their North Island tour, having in many cases, their first introduction to the Pohutukawa or N.Z. Christmas tree (*Metrosideros excelsa*). Belonging to the Myrtaceae, the flowers have conspicuous red stamens, somewhat similar to certain species of *Eucalyptus*. Although naturally a coastal tree, it has been introduced to many inland parts of N.Z. The native cabbage tree (*Cordyline australis*) was also abundant. This is a Monocotyledon which has developed a woody growth form and is up to 40 ft. high. It is typical of much of the N.Z. scenery often growing abundantly in paddocks as well as in forests and coastal areas. Originally in the Liliaceae, it is now put by some authorities in the Agavaceae. Other plants seen frequently throughout N.Z. were soon learnt. These included the native flax—*Phormium tenax* (now used commercially for its strong fibres), and the nikau palm — *Rhopalostylis sapida*. The latter gives a tropical appearance to the scenery. The nikau berries take

three years to develop and ripen to a deep red colour. Tree ferns (*Dicksonia* and *Cyathea* species) were plentiful either as isolated specimens or growing in dense groves.

A detour to Bushy Park, north of Wanganui, gave an excellent example of lowland rainforest, with good specimens of rewarewa (*Knightea excelsa*), one of the two species of Proteacea in N.Z.. Titoki (*Alectryon excelsum*) and the northern rata (*Metrosideros robusta*) were both of interest. The Titoki has a brown covered fruit which splits open to expose a bright scarlet fleshy aril with a black seed projecting from it. It is a favourite food of the wood pigeon (*Hemiphaga novaezelandiae*). The rata is closely related to the pohutukawa and hybridisation frequently occurs between these two. The rata tree has a different growth form from the pohutukawa and lacks the white tomentum of leaf and young shoot. Trees showing characteristics of both parents, in varying degrees, are common. One large rata at Bushy Park had a girth of 45 ft. This species of rata begins as an epiphyte and sends roots down to the ground. This root system enlarges and surrounds the tree on which it began life. It was previously thought that it strangled the supporting tree, but recent research indicates that death is possibly due to overshadowing by the large spreading rata crown. The lush ground cover of ferns — *Asplenium* and *Blechnum* species being very common — was typical of most forest areas.

At the end of a long day's drive,

Mt. Egmont's clear conical outline dominated the Taranaki plains. A blue sky, and snow on the upper slopes of this 8,160 ft. mountain made everyone happy with the prospects of a good day to follow in alpine and sub-alpine areas. However, typical of N.Z. mountains it was deceptive. The next day cloud was low and rain fell heavily. The annual rainfall for the Stratford House area is 250 in. per year. Fortunately, the ranger, stationed at the national park came to give a talk illustrated with slides. After this, undaunted by the weather, the party set off in groups to various areas on the mountain.

Mt. Egmont has some interesting features. It is an andesitic volcano, the last eruption probably being about 220 years ago, but the main one was 100 years earlier. Botanically it has been described as an "island" flora in that the alpine composition is different from other North Island mountains and also some common species are somewhat different from the North Island ones, showing that evolution due to isolation is occurring. Beech forest (*Nothofagus* species) typical of such an altitude elsewhere, is lacking. Several hypotheses have been suggested, one being that beech is slow to spread and hence has not been able to reach this isolated mountain.

The forest on Egmont is dense and several trees dominate the canopy — e.g. *Libocedrus bidwillii*, *Weinmannia racemosa* and Hall's totara — *Podocarpus hallii*. The tree fuchsia (*Fuchsia excorticata*) is abundant, and with its gnarled moss and lichen covered branches gives parts of the forest an elfin appearance. Some of the alpine and sub-alpine plants were in flower, e.g. *Ourisia macrophylla*, and *Pterostylis banksii*; but on the whole the flowers were disappointing. The party which did the walk down Waipuku track saw good examples of

mountain zonation. Bad weather prevented investigation of the highest limits of vegetation. Egmont emerged from the cloud to bid farewell the following morning as the bus set off for Auckland via Waitomo on one of its marathon mileage days.

The highlight of the Waitomo limestone caves was the trip by boat into the glowworm grotto. Innumerable larvae of *Arachnocampa luminosa* shone coldly in otherwise total darkness, the complete silence adding to the effect. Glowworms are not confined to caves, and their lights were seen later on clay banks at Fox Glacier and Milford Sound.

The day in Auckland had three "musts". Firstly a trip to the west coast to see kauri forest in the Waitakere Ranges, and sand-dunes at Piha; secondly a visit to the zoo to see kiwis, and finally the museum with its fine Maori displays and geological and zoological sections.

The Waitakere Ranges (1,100 ft.), close to Auckland city are composed of an andesitic conglomerate known as the Manukau Breccia, of Miocene age. The kauri forest is typical of parts of the northern half of the North Island. Fossil remains show that at one time it extended about 700 miles south to Dunedin, when climatic conditions were more tropical. Now it is limited to north of latitude 38°. Kauri (*Agathis australis*), endemic to N.Z., has always been keenly sought after, not only for its durable timber — houses built of it over 100 years ago are still sound, but also for its long clean trunks which lack knots. Thus uncontrolled felling in the past has caused the destruction of many forests. The young kauri has a conical form (called a ricker) but as it grows the side branches are shed in a manner similar to leaf fall, and hence no knots form. Sixty to seventy years later its growth form alters, to produce a

spreading crown on top of the large straight trunk. The bark is also shed in large irregular pieces and this often prevents growth of epiphytes. Mounds of acid humus many feet deep build up at the base of large kauris. Small, irregular roots from the trees penetrate the mound to absorb minerals. Thus the kauri is adapted to recycle its own minerals. A kauri grove has certain species associated with it, some of which occur nowhere else, e.g. *Blechnum fraseri* — which has the appearance of a miniature treefern. Some existing kauris in North Auckland are thought to be over 2,000 years old. Kauri regenerates in tea-tree scrub and after many years of kauri growth the soil alters. In parts of the old kauri lands of North Auckland, where forest no longer exists, only certain species like *Pomaderris kumeraho* (gumdiggers' soap) can survive in the phosphate deficient soils, the acidity of which is often as low as pH 3.6. *Pomaderris* and *Cyathodes* are adapted to these conditions by having mycorrhizal fungi associated with their roots.

There was not sufficient time to examine the sand dunes at Piha thoroughly. However in many respects they are similar to those in Victoria having *Spinifex hirsutus* and marram grass (*Ammophila arenaria*) as the sandbinders. An endemic species, *Desmoschoenus spiralis* also grows on the foredunes. The introduced Californian lupins are grown in the fixed dunes and in some places *Pinus radiata* forests have been established on dune lands. The sand at Piha was black and this type of sand had already been seen at Mokau, after leaving Mt. Egmont. Many beaches on the west coast of the North Island contain iron minerals which in some areas are being extracted commercially. It was unfortunate that the trip did not allow more time for coastal

investigation as there are well over 4,000 miles of varied coastline in New Zealand.

The kiwi (*Apteryx mantelli*) in the nocturnal house at the Auckland Zoo, showed itself to advantage. The bird is unusual in that its nostrils are at the tip of its beak and the female lays an egg one-quarter of the total weight of her own body. Twins have been recorded, too! Although dogs and cats, together with man's clearing of the forests, have greatly reduced the abundance of the flightless bird, they still exist in fair numbers but are difficult to locate. There are four species of *Apteryx*.

The Tuatara (*Sphenodon punctatus*), a primitive reptile related to the Dinosaurs, refused to appear from its hiding place in the cage at the zoo. They are reputed to have a life span of possibly over 300 years, and show many primitive features. No longer existing on the mainland, these two-foot-long reptiles are restricted to certain islands off the east coast of North Auckland. Lethargic animals, they have the lowest respiratory rate known for any animal.

Rotorua entertained with its thermal activities. Boiling mud pools, reluctant geysers, and hot springs together with other tourist attractions filled up one and a half days. The ubiquitous tea-tree has become adapted to the thermal conditions and will grow where all else would die. It has become the climax vegetation in some areas because nothing else can replace it. Rotorua is a Maori centre (96% of the Maoris live in the North Island of New Zealand) and there were opportunities to see various Maori crafts, including how to make flax clothing. Although some members of the party began making them, no one completed the trip in a self-made Maori skirt.

Rotorua is situated on the earthquake belt, but none was experienced

during the visit. Had the party arrived in Wellington a day earlier they would have felt a substantial two-minute quake (6.8 on the Richter scale) which was widespread over the North Island. There are two separate regions of earthquake activity in N.Z. The larger includes most of the North Island (except the North Auckland peninsula) together with the northern part of the South Island (latitudes $36\frac{1}{2}^{\circ}$ to $43\frac{1}{2}^{\circ}$). The second region incorporates Southland, West Otago and South Westland. Later in the trip in the Buller Gorge, mountain slips were observed which were the result of the 1968 earthquake which killed three people at Inanguhua.

Perhaps one of the most remarkable features of the tour was the visit to Rogue Bore in the Wairakei steam power area. An eight-inch bore was put down about 14 years ago, and explosive results led over the years to the formation of an area several hundred feet wide, filled with water and steam which frequently erupts. An unforgettable feature is the continuous shaking of the ground which affects several miles around the bore. The sensation is similar to that of certain types of earthquakes.

Tongariro National Park is a centre where more time could have been profitably spent. Here, mountain beech (*Nothofagus solandri* var. *cliffortioides*) is the dominant tree and grows to an altitude of about 5,000 feet. This beech forest contains many interesting plants such as the appropriately named stinkwood (*Coprosma foetidissima*) and abundant *Pterostylis banksii*. Below the beech forest is the large volcanic plateau covered mainly with red tussock grass (*Chionochloa rubra*), introduced heather (*Calluna vulgaris*), and the grass tree (*Dracophyllum longifolium*). This is a natural grassland area but the introduced lodge pine (*Pinus contorta*) if

not eradicated will take over. The tussock — *Dracophyllum* — heather relationship is now fairly stabilised and the heather does not seem likely to oust the native plants. Beekeepers favour *Calluna* because *Dracophyllum* gives poor honey. Incidentally, the introduced bumble bee (not honey producing) with its large black and orange striped body, was one of the interesting insects seen on the trip.

The three volcanoes in this national park are Mt. Tongariro (6,458 ft.) which has a number of craters and hot springs; Mt. Ngauruhoe (7,515 ft.) a perfect cone which has periodic activity, and Mt. Ruapehu (9,175 ft.). Ngauruhoe, which has been fairly active over the last year produced only a quiet display for the trip. Activity includes larva flows and rock and ash showers, although it is several years since the former has occurred.

A morning was spent on the scoria plateau of Mt. Ruapehu in the company of a national park ranger. Various alpine plants such as *Dracophyllum recurvum*, *Celmisia* species and *Hebe tetragona*, were seen. Some of the party took the ski-lift to higher altitudes but time was not available to climb to the crater lake. This acid lake varies from cold to boiling, so care is needed before swimming. The exit of the lake is via an ice cave which leaves the base of the Whangaehu Glacier by a river of the same name. On Christmas Eve, 1953, volcanic activity caused the exit of the lake to enlarge and a raging torrent of water, boulders and mud rushed down the river valley. This mass of huge debris destroyed the supports of the railway bridge at Tangiwai, just prior to the arrival of the north-bound Wellington-Auckland express. The resulting disaster caused the loss of 151 lives.

From National Park it was back to Wellington. Unfortunately the Mt.

Bruce sanctuary was closed to visitors. It was here that the first *Notornis* chicks were hatched in captivity. Both died however, just prior to the cancelled visit. The Takahe (*Notornis hochstetteri*) was thought to be extinct but was rediscovered in 1948 in the wild mountainous country west of

Lake Te Anau in Fiordland. Much research is being done on this bird which is related to the swampphen, Por (*Porphyrio melanotus*). It is a grazer, shearing off the tussock grass with its large beak.

(To be continued.)

The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name

[continued from 90 (5)]

Dennstaedtia. Named by Bernhardt after August Wilhelm Dennstedt, a German botanist of the early 19th century. His name is sometimes spelt Dennstaedt, a surname derived from a place of that name in Thuringia, now spelt Denstedt.

Deschampsia. Named by Palisot de Beauvois after Louis Auguste Deschamps (1765-1842), a French surgeon-naturalist who investigated the natural history of Java. Deschamps, Ventenat and La Billardiére were all members of the scientific personnel of the D'Entrecasteaux expedition in the *Recherche* and *Esperance*.

**Desmazeria*. After J. B. J. H. Desmazières (born 1796; Black gives 1862 as the year he died, but De Virville in his *Histoire de la Botanique en France* gives 1852). He amassed a large herbarium of dried plants of France, and wrote on the cryptogams of the northern part of his country.

Deyeuxia. After Nicolas Deyeux (1753-1837), professor at the School of Pharmacy and Faculty of Medicine, Paris.

Dicksonia. Named by L'Héritier after James Dickson (1738-1822), F.L.S., an English nurseryman who became a competent botanist, writing on British cryptogams, his mosses being in the herbarium of the British Museum. His collection of phanerogams went to the Linnean Society.

Dillenia. After Johann Jacob Dillenius (1684-1747), born in Darmstadt, Germany, and died at Oxford, where he had become in 1728 the first Sherardian Professor of Botany. His given names were anglicized as John James. His work on the mosses in 1741 was illustrated by himself. He corresponded with the great Linnaeus, who named the genus after him. (*D. procumbens* has long been known as *Hibbertia procumbens*, of the family Dilleniaceae.)

Dillwynia. Named by Sir J. E. Smith after Lewis Weston Dillwyn (1778-1855), spent most of his life at Swansea, where he owned the pottery and two streets are named after him. A competent botanist, he was F.L.S. and F.R.S.

Dodonaea. Named by Philip Miller after Rembert Dodoens (1517-1585), Dutch botanist, author of *Cruydeboek* on domestic and foreign plants.

Doodia. Named by R. Brown after Samuel Doody (1656-1706), a London apothecary who was curator of the Chelsea Physic Garden from 1691. He assisted Ray with his *Synopsis* and *Historia Plantarum*, and wrote on mosses.

Drakaea. Named by Lindley after Miss S. A. Drake (fl. 1831-1847), botanical artist, who illustrated works on orchids by Lindley and by Bateman. (Now *Spiculaea* in *S. huntiana*.)

**Duchesnea*. Named by Smith after N. Duchesne (1747-1827), who in the botanic garden at Trianon specialized in the study of strawberries, which he monographed in his *Histoire Naturelle des Fraisiers* (1766). Our introduced species, *D. indica*, is known as the Indian Strawberry, and like the true strawberries, *Fragaria*, belongs to family Rosaceae. Duchesne also wrote a manual of botany, and a natural history of gourds and pumpkins. (Even his surname is botanical, meaning 'of the oak'.)

**Ehrharta*. Named by Carl Thunberg, the great Swedish botanist of the flora of South Africa, after F. Ehrhart, a Swiss botanist.

**Eichhornia*. Named by Kunth after J. A. F. Eichhorn (1779-1856), a Prussian Minister of Education. *E. crassipes*, our introduced pest, is Water Hyacinth, a native of tropical America, and is known as Lilac Devil in the Congo.

Eugenia. Named by L. after Prince Eugene of Savoy (1663-1736), the distinguished soldier who was Marl-

borough's ally. Born François Eugène de Savoie-Carignan, he renounced France when Louis XIV banished his mother, and his military fame was earned as an Austrian general.

Euphorbia. Named by L. after the name of an African species that had been named by King Juba of Mauritania after Euphorbus, his Greek physician, who had discovered its medicinal uses. (The name means "good pasture" in Greek.)

Ewartia. Named by Beauverd (1910) after Alfred James Ewart (1872-1937), professor of botany, Melbourne University, and Victorian Government botanist. The most notable of his works was *Flora of Victoria*. He was elected F.R.S. in 1922.

Fieldia. Named by Allan Cunningham after Barron Field, judge of the Supreme Court of N.S.W. He was born in London in 1786, and died in Torquay, Devon, in 1846. He sent plants and drawings to Hooker from New South Wales.

Frankenia. Named by L. after Johan Frankenius (1590-1661), professor of botany and anatomy at the University of Uppsala, Sweden. He apparently was not very notable, as he is not mentioned in *A Short History of Botany in Sweden*, by R. E. Fries (published for the 7th International Botanical Congress in 1950 held in Stockholm), which includes the names and work of 450 Swedish

**Freesia*. After Friedrich Heinrich Theodor Freese (died 1876) of Kiel, a friend of Ecklon, who named the genus.

Gahnia. Named by the Forsters after Dr. Henry Gahn, Swedish botanist, who was a friend of Linnaeus. (Another omitted from the 162-page history mentioned above.)

**Galinsoga*. After Mariano Martinez Galinsoga, an 18th century Spanish doctor, by Ruiz-Lopez and Pavón. Stearn says 'his botanical accomplishments match the smallness of their flowers', referring to *G. parviflora*, the common weed that is comically known as Gallant Soldier, a corruption of Galinsoga! The plant originated in Latin America (from Mexico to Argentina). Willis gives Potato Weed as another of its common names.

**Gaudinia*. Named by Pal. Beauverd in 1812 after Jean François G. Gaudin (died 1833), pastor at Nyon in Canton Vaud, Switzerland,

author of 'Flora Helvetica' and 'Agrostologia Helvetica' (i.e. works on the general Swiss flora and on the grasses of that country respectively).

Gaultheria. After Jean François Gaultier (sometimes spent Gaultier) (c. 1708-1756), a French physician and botanist of Quebec, but only two of the 200 species are native to eastern North America.

Geijera. Named by Schott after J. D. Geijer, a Swedish botanical author. This generic name of the Wilga is usually pronounced geejera, with the initial g hard, but the Swedish surname is pronounced yeier.

William Howitt and Australian Natural History

by

G. BLACKBURN

After almost two years in Victoria, William Howitt returned to England in 1854 and completed his major book with an Australian theme—"Land, Labour and Gold" (1855). This has been re-issued recently* and has value for field naturalists as well as for sociologists, economists, and historians.

For many Victorians the only notable Howitt was Alfred William, the explorer, geologist, anthropologist, and member of the Field Naturalist Club of Victoria. This book, by his father, will certainly interest those curious about the son, but it provides original observations on several aspects of natural history, and useful references to its students in Australia more than a century ago.

In "Land, Labour and Gold", William Howitt tells of plants, birds, rep-

tiles, insects, mammals, weather, soils, rocks, and gold. All his information seems to be out of direct contact with life, though one may suspect that the energy and interest of his elder son, Alfred, were responsible for many of the experiences. However, by noting entries in the index, specially compiled for the new edition, and by examining the author's narratives for periods when he was unaccompanied by his sons, it can be seen that his botanical interests transcended others in the realm of natural history. This fits with the fact that he maintained special affection for *Eucalyptus* long after leaving Australia: he encouraged plantings in Italy where he died in 1879.

Birds he regarded as "perhaps . . . the most striking feature of Australia" (p. 58); he referred to more than sixty species. Insects are mentioned repeatedly, but his remarks about flies

*In 1972 by Lowden Publishing Co., Kilmore, Victoria, and by Sydney University Press, Sydney.

lose the detached curiosity and become almost emotional. He thought that the general lack of fruit-bearing plants in Australia (p. 113) was particularly significant for the Aboriginal way of life. He was struck by "the extreme tenacity of life in many of its animals" (p. 111) and instanced the "opossum" and the hawk. As prospectors for gold in the 1850's, Howitt and sons learnt to live off the land and thus acquired direct knowledge of game birds and river fish. Not all the hunting was for food — take the episode of their wombat hunt (p. 303). This appears to have been inspired more by curiosity than by hunger, and it is probable that Alfred initiated the quest. It involved digging three holes, each to ten feet, and it is unlikely that father William — then in his sixty-fourth year — competed with Alfred (27) and the man called Lignum and described as an Irish giant. One of the curiosities recorded by the author was the Aboriginal practice of digging narrow perpendicular holes in search of wombats. This was also later referred to by Brough Smyth ("The Aborigines of Victoria, 1876, Vol. 1, p. 149).

The Howitt trio — William, Alfred and Charlton — sought gold in the north-east, at Bendigo, and at Ballarat. Despite a longish stay at Bendigo, they seem to have had no experience of the Whipstick Scrub there. This type of eucalypt vegetation is referred to only from the Goulburn diggings, near Waranga and Rushworth, and there is no mention of the Mallee, though this word was used and explained in another book by Howitt: "Tallangetta, the Squatter's Home" (1857). It is also interesting that William Howitt made no reference to any mound-building birds, though he was very interested in birds and knew of John Gould, who had previously described the bird, *Leipoa ocellata*,

we know as the Lowan or Mallee Fowl.

One topic that may appear unusual in Howitt's book is "crab-holes", but these were almost synonymous with uncomfortable travelling on the roads. He recorded them from the Kilmore district and also near the Campaspe River, between Heathcote and Bendigo. One peculiarity, which may refer to the linear form of gilgai micro-relief, is the account of ground, apparently between the Colbinabbin Range and Cornella Creek, which resembled ploughed land (p. 276).

William Howitt had become well known as an author before his visit to Australia and had no difficulty in meeting men and women with kindred interests. During his stay in Melbourne he was made an honorary member of the Mechanics Institution and of the Philosophical Society, fore-runner of the Royal Society of Victoria. His meeting with particular people concerned with natural history are mentioned only with respect to Tasmania. There he visited several such people, including old friends. In the Launceston district, he met Ronald Gunn, the botanist. At Swanport he stayed with the Merediths, and at Campbell Town he renewed friendship with Dr. William Valentine. Louisa Meredith (nee Twamley) had by then become the author of books dealing with nature in England and Australia. Dr. Valentine was a medical practitioner who was also devoted to astronomy and microscopy.

Alfred Howitt probably gained immensely from association with a father who had wide interests, considerable experience, and encyclopaedic knowledge. Victorians are fortunate that human activity and natural history in and near the goldfields were recorded so fully and entertainingly by a man in his sixties who adapted so well to the strange and often inhospitable life in Australia.

Field Naturalists Club of Victoria

Field Survey Group

Camp Report

May: Otway Ranges.

Eight members and friends attended a most successful camp in the Otway Ranges. The group met at Geelong and proceeded to Benwerrin via Deans Marsh, collecting at several points along the way. Near Benwerrin, *Peripatus* was found, and at most of the localities various species of non marine molluscs including the species endemic to the Otways, *Victaphanta compacta*. The group moved on to the Aire Valley Plantation where collecting was done in the conifer plantations. Camping at Beauchamps Falls Park, two night-survey parties set out, but their work was curtailed by heavy rain.

On Sunday the group continued through the plantation to Apollo Bay, then to Cumberland River. Following collecting along the Cumberland River, members returned to Melbourne. Of particular note in the Otways were the many beautiful fungi and ferns. A white Goshawk (white phase) was observed near Apollo Bay. This bird is fairly rare. Planaria collected included *Geoplana warragulensis* and an unknown species. Voice records of *Geocrinia victoriana* were obtained, but few specimens of frogs and toadlets were found.

Botany Group—10 May.

Speaker at the May meeting of Botany Group was Mrs. P. Matches, who spoke on Sedges and Rushes, with particular emphasis on the differences between the families Cyperaceae and Juncaceae. Mrs. Matches has made an extensive study of these often overlooked and less showy plant families and she displayed a number of pressed specimens from her own collection to illustrate the talk.

A report was received on the very successful fungi excursion to Kinglake and a vote of thanks to the leader, Mr. Jim Willis, was carried. Miss White handed in a list of eighty-eight different species which had been seen on the day. Unfortunately, plans for the May excursion had to be abandoned, due to lack of transport.

Flower for the night was *Banksia ornata*, and live specimens were displayed and a sheet of notes was available. All of Victoria's six *Banksia* species were on display, either in flower or dried.

Other exhibits were *Pittosporum phyllireoides* from Mrs. Zirkler, and a male cone of *Cycas media* from Miss White. Both members spoke briefly about their exhibits. Mr. Baines gave a brief review of "The Observer's Book of Sedges Grasses and Rushes" and the periodical "Growing Australian Plants".

Latrobe Valley Naturalists Report 1972/73

President—Mr. T. Moretti.

Hon. Secretary—Mrs. Iris Peterson,

14 Barry Street, Morwell 3840.

Up to thirty members attend meetings, visitors are welcomed and some are often present. Members were sorry to lose their secretary of ten years, Mr. Simon Belgraver, who has resigned for health reasons.

The club has been active in conservation projects, chief of which was an extensive survey of Crown lands in the Rosedale area, which formed the basis of submissions to the Land Conservation Council.

The Latrobe Valley Naturalist, the

club journal, reports the speaker's talk at the monthly meeting, and also the excursion that follows to such places as the Channel Country of the Avon River, the Mitchell Gorge, South Cascade, or Yanakie. Two very successful boat trips were undertaken in ideal weather from Welshpool; one in the spring to Little Snake Island, and the other in March to Refuge Cove.

The annual get-together of Gippsland clubs was held this year at the Ski Village on Mt. Baw Baw, on A.N.A. weekend. It attracted more than fifty people representing all local clubs, as well as some from F.N.C.V.

ERRATA

An unfortunate error inadvertently occurred in the obituary to Mr. E. S. Hanks in the *Victorian Naturalist* for May. The late Mr. Hank's correct Christian names were Ernest Silveston, not Ernest Silvestor as printed.

The Editor's sincere apologies go to his family.

Additional Information on Country and Junior F.N.C.

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Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

Set of "Victorian Naturalists"

Following the recent offer of a set of "Naturalists", requests were received from the Libraries of C.S.I.R.O. (Division of Wildlife Research), La Trobe University, Native Plants Preservation Society, and the Gould League. Would any member who has a set of "Naturalists" of some duration which they would be prepared to give to one of these Libraries, please contact the Secretary.



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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 9 July — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — The New Zealand Excursion
New Members p. 207

GROUP MEETINGS

(8 p.m. at National Herbarium unless otherwise stated)

Thursday, 12 July — Botany Group. Speaker — Mr. Rex Filson: "A Botanical Meal in Japan."

Sunday, 29 July — Botany Group Excursion — Ocean Grove.

Wednesday, 18 July — Microscopical Group Meeting.

Thursday, 19 July — Day Group Meeting.

Thursday, 26 July — F.S.G. Meeting in Conference Room, National Museum, Vict., at 8.00 p.m. Mrs. Jan Watson, Hon. Assoc. Nat. Mus. Vict.—"Marine Surveying".

Monday, 6 August — Marine Biology and Entomology Group Meeting in Conference Rooms, Nat. Mus. Vict., at 8.00 p.m.

Wednesday, 8 August — Geology Group Meeting.

CAMPS

11 August — F.S.G., Strathbogie Ranges.

JUNIOR F.N.C. MEETINGS

Friday, 27 July — Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 3 August — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 10 August — Black Rock Juniors at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

Friday, 10 August — Montmorency and District in Scout Hall, Petrie Park at 8.00 p.m.

F.N.C.V. EXCURSIONS

Sunday, 15 July — Wollert. The area to be visited is an old farm obtained by Andrews Antennas Company for use as a testing range. Only part of the property will be required for this purpose and they propose using the remainder of the 190 acres for a conservation project with the co-operation of the F.N.C.V. A representative of the Company will meet us on the site. The coach will leave Batman Avenue at 9.30 a.m. Fare \$1.60 — bring one meal.

Saturday, 25 August-Friday, 7 September — Warrumbungles, Canberra, etc. The coach will leave Melbourne from Flinders Street at 8 a.m. on Saturday, 25th August, stopping overnight at Finley, on to Parkes for Sunday night and arriving at Coonabarabran, Monday, where the party will remain until Sunday, with day trips to the Warrumbungles and surrounding areas. Sunday, 2 September, the party will commence the return journey, stopping overnight: Sunday, Wellington; Monday, Bathurst; Tuesday and Wednesday, Canberra; Thursday, Albury; reaching home on Friday. Accommodation is on a dinner, bed and breakfast basis and members will be responsible for their own lunches. It was necessary to divide the party in Coonabarabran, so the cost for the excursion will be \$155 with hotel accommodation there and \$170 for motel. The full amount should be paid to the excursion secretary by 31 July — all cheques being made out to Excursion Trust.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

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4 July, 1973

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Front Cover:

The Spotted Marsh Frog (*Lymnodynastes tasmaniensis*) is caught in a "thoughtful" pose by the photographer, John Wallis.

FNCV Excursion to New Zealand, 1973

[continued from 90 (6)]

From Wellington the party left for the South Island travelling across Cook Strait to Picton. Various seabirds, such as the black-backed gulls and albatrosses followed the boat. Entry to the South Island was through the picturesque Marlborough Sounds which are drowned valley systems and form an intricate network of islands and peninsulas. An interesting feature seen at Nelson was the Boulder Bank, a natural breakwater about seven miles long. It is a spit made of gravel and boulders which encloses the harbour. Also in this city is the fine view point from the summit of Botanical Hill, which is the geographical centre of New Zealand. Time did not permit a visit to the Dun Mountain, a mineral belt. This mountain consists mainly of dunite, an olivine rock which changes to serpentinite.

Extensive areas of exotic forests were seen throughout N.Z. The tree grown most commonly for timber is *Pinus radiata*, but other species of pine, e.g. *Pinus patula* are also used. Eucalyptus forests have been planted, but these trees often tend to grow too quickly, and this affects the quality of the wood. Many of these forest areas are still in the experimental stage.

The drive from Murchison followed the scenic Buller Gorge, where the road winds high above the river. Although still far from good, south island roads have been vastly improved over the last ten years and touring is less hair-raising! Even so, the bus had difficulty in negotiating some bridges and bends. Signs of previous earthquakes were visible in the Buller Gorge.

Perfect weather showed the coast between Westport and Greymouth to good advantage; toetoe (*Cortaderia splendens*), native flax (*Phormium tenax*), cabbage trees (*Cordyline australis*) and nikau palms (*Phoplostylis sapida*) giving a typical New Zealand picture. The toetoe (formally *Arundo conspicua*) hybridises with the South American pampas grass, this being one of several features which indicate affinity between the flora of the two countries. The highlight of this part of the trip was the stop at Punakaiki. A track through coastal bush and shrubland lead to a headland of blow-holes, chasms and rock formations. The stratified limestone, eroded by wind and sea has been carved into striking irregular columns resembling piles of pancakes and hence the common name for this area — the Pancake Rocks. This headland would be very spectacular during a storm.

Wekas (woodhens) appeared on the roadside at Punakaiki with two young chicks. These birds (*Gallirallus* species) about the same size as a small fowl, are flightless and fast runners. They have inquisitive natures which cause them to steal small shiny objects left lying about. Native birds were rather disappointing on the trip and although red-billed gulls (*Larus novaehollandiae*) black-backed gulls (*Larus dominicus*), Kingfishers (*Halcyon sancta*), Tuis (*Prosthemadera novaeseelandiae*), wood pigeons (*Hemiphaea novaeseelandiae*), fantails (*Rhipidura flabellifera*) were seen fairly frequently, most other native birds tended to remain rather aloof. The rifleman (*Acanthisitta chloris*) — the smallest bird in N.Z. — was seen

only occasionally. It is a wren only three inches long and has a very reduced tail. Bird calls, including the night morepork, were heard from time to time, but the forest was silent in comparison with Australian bushlands.

The vegetation of the northern part of the South Island's west coast contains beech forest, but this then gives way to mixed forest of rimu (*Dacrydium cupressinum*), southern rata (*Metrosideros umbellata*) and the Kamahi (*Weinmannia racemosa*). Further south, beech returns again. Various hypotheses for the absence of beech in this central West Coast area have been made. One is that severe glaciation has destroyed the original beech here and it has not regenerated. However D.S.I.R. (Department of Scientific and Industrial Research) are carrying out investigations at the present time and no one is prepared to give a definite answer.

The southern rata (*Metrosideros umbellata*) was in full bloom and looks very similar in flower structure to the northern rata (*M. robusta*) and the pohutukawa (*M. excelsa*) but the growth form of the three trees vary. Masses of scarlet and red flowers did much to brighten the somewhat sombre appearance of the N.Z. forest.

A stop at a greenstone factory in Hokitika gave everyone the chance to examine the much prized nephrite — used in the past for Maori ornaments and weapons, now for souvenirs and jewellery. The various stages from the native rock to the finished article could be observed. The greenstone is brought out by helicopter from the upper part of the rugged and inaccessible Arahura Valley.

A short visit was made to the Franz Josef Glacier which together with the Fox Glacier are the lowest temperate glaciers in the world, de-

scending to less than 1,000 ft. above sea level. Their terminal faces have varied considerably over the last 100 years, showing periodic retreats and advances. Both glaciers arise in the snowfields on the western slopes of the Southern Alps and require heavy snowfalls to supply the glacial ice. Snow occurs in summer as well as winter, and the annual fall can be up to 300 ft. in thickness. The valleys descend steeply, e.g. the Fox falls 8,000 ft. in eight miles, and ice moves at the rate of 15 ft. per day. Thus the ice can travel to lower levels before it melts.

A two-night stop at Fox Glacier gave time to examine more fully the glacier and vegetation. The Minnehaha walk was well worth while, showing the incredibly twisted growth of *Weinmannia* trees (*W. racemosa*). These trees start life as an epiphyte and produce weird growth forms. There was also a prolific growth of other epiphytes, lianes and ferns. In the North Island these growth forms were also abundant, e.g. *Astelia* and *Colleospermum* species caused a tremendous weight on the branches of many forest trees. However in the Fox Glacier region it seemed as though there were an impossible number of plants perching on others and many trees had no bark exposed. Among the luxuriant growth of ground ferns the Prince of Wales feather or crepe fern (*Todea superba*) with its feathery fronds, was especially beautiful. Supplejack (*Rhipogonum scandens*) occurred here as well as in the North Island forests, and at times the almost impenetrable tangle of stems gives the forest a tropical appearance. A fine specimen of the flatworm, *Geoplana flavimarginata*, was observed.

Although mountain reflections were not perfect due to a slight breeze, the

early morning visit to the moraine formed Lake Matheson was still worth while. Mt. Cook and Mt. Tasman stood out clearly behind the lake. Along the track were clumps of the unique kidney fern [*Trichomanes* (formally *Cardiomanes*) *reniforme*] and lanternberry (*Energea parviflora*). On the nearby Lake Gault track were patches of the giant moss (*Dawsonia superba*). This moss also grows in other parts of New Zealand particularly in Kauri forests, and when fertile, with its large red capsules is very conspicuous. Liverworts grew abundantly in the Fox region as well as elsewhere, and *Monoclea forsteri* — the largest liverwort in the world — was found in several places. It reaches a size of 15 cm x 15 cm. As well as the large southern rata (*Metrosideros umbellata*) three species of climbing rata were found, *M. diffusa*, *M. perforata* and *M. fulgens*. These species never become trees.

A trip up the Fox Valley and on to the glacier had many interesting features. One of these was a kettle lake formed where a large block of ice had been buried in moraine gravel and then, subsequently had melted, leaving a large water-filled hole. "Dead Ice", glacial scratches and strikingly patterned mica schist rocks, were some of the things observed. The temptation to overload luggage with rock specimens was too great for many of the party.

Those who took advantage of the fine weather to go on a plane trip did not regret it; especially as later bad weather prevented flights at Mt. Cook. Magnificent views of the coast, bush and mountains, together with a ski landing at 6,000 ft. in the snowfield at the top of the Fox Glacier, made it an unforgettable experience.

Unfortunately the trip to Gillespies Beach was cancelled due to the bus being unable to cross one of the

bridges. The beach is the site of an old goldmining ghost town and as well as being extremely scenic, has a fur seal colony nearby.

The walk along the moraine track had various points of interest. Not only was a ridge of moraine observed, but the difference in age between the old forest and the young, was quite striking. The former had never been destroyed by glacial action, whereas the latter had arisen after the retreat of the ice.

Altitudinal zonation is well shown in New Zealand mountains. In the Fox region the warm temperate belt rises from sea level to 500 ft., and is then replaced by the montane or cool temperate belt to the 3,000 ft. level. This rain forest consists of rimu (*Dacrydium supressinum*), miro (*Podocarpus ferrugineus*) and other smaller trees and ferns. The sub-alpine belt showing a transition from forest to scrub lies between 3,000-4,000 ft. Plants common here are the N.Z. "Cedar" — *Libocedrus bidwillii* and the grass tree, *Dracophyllum longifolium*. The lower and higher alpine belts extend to 6,000 ft. with snowgrass, *Celmesia* and *Ranunculus* species giving way to dwarf herbs in the upper limits. Finally the rival belt of lichens extends to 8,500 ft.

From Fox Glacier the route followed the coast to Haast. Knight's Point gave excellent views and seals could be seen far below on the beach. The road through Haast was completed in 1965 and before this it was necessary to return from Fox to Greymouth in order to cross the Southern Alps. Engineers had great difficulty in completing the road because of the high rainfall and consequent floodings. The steep mountain rivers and rocky terrain cause rapid run-off which quickly changes a normal river into a raging torrent. Several bridges were destroyed during the construction of

this "round trip" road and trouble caused by slipping still exists.

An overnight stop at Lake Wanaka and then on to Milford Sound via Lake Te Anau, which is the largest South Island Lake. The largest New Zealand lake, Taupo, was seen when travelling from Rotorua to National Park. On the western side of Lake Te Anau the almost impenetrable rugged beech-covered mountains of the "Notornis Country" could be seen.

The spectacular drive up the Eglington, Upper Hollyford and Cleddau valleys to Milford Sound passed through forest containing the three species of *Nothofagus*. These were the red beech (*N. fusca*) which has serrated leaves, larger than the other two species; silver beech (*N. menziesii*) with smaller serrated leaves and mountain beech (*N. solandri* var. *cliffortioides*) which has small unserrated leaves. The Homer Tunnel which is about three-quarters of a mile long, links the Upper Hollyford and Cleddau valleys, is cut through the rocky mountain side in an avalanche area. The beech forest is absent here, having been destroyed by the action of many avalanches; and in its place poorly developed scrub exists among huge boulders. Precipitous mountains and varied vegetation give outstanding views as the descent to Milford Sound is begun. Mountain ribbonwood (*Hoheria glabrata*) with its soft lighter green leaves looked out of place amongst the sombre harsher foliage of the forest. This tree is one of the few deciduous N.Z. trees. Two others are Kowhai (*Sophora microphylla*) and tree Fuchsia (*Fuchsia excorticata*). Under some conditions leaf fall is not complete.

At the Sound, the party was given an unwelcome greeting by innumerable sandflies, but the day trip on the launch in perfect weather compensated for the previous evening's trials. Not only was

the scenery majestic, but seals were clearly seen on nearby rocks; glacial markings on steep cliffs observed; and finally playful dolphins followed the launch. Milford and the adjacent Sounds (really fiords) are glaciated valleys and hence have steep sides going deep into the sea. Leaving the Sound in rain the following day, the drive up the 3,000 ft. incline to the Homer Tunnel showed how quickly waterfalls can appear in these mountains where there is a large catchment area and little soil to hold the water.

The journey from Milford to Queenstown retraced the route previously covered except for a brief detour to Lake Manapouri — site of conflict between conservationists and hydro power authorities over the raising of the lake level. The former have won the dispute.

A good view was obtained of the "Kingston Flyer" — not a bird, but a vintage steam train. The train does a daily 38-mile service between Lumsden and Kingston and was travelling north at the same time as the bus. Both arrived at Kingston within minutes of each other, thus allowing steam enthusiasts to look over the train.

From Kingston the road runs between Lake Wakatipu and a range of mountains — the Remarkables. The lake is "S" shaped, 52 miles long but only 1-3 miles wide. It is over 1,000 ft. above sea level but more than 1,200 ft. deep, so that like many of the New Zealand lakes of glacial origin, the floor is below sea level. Kingston is situated on the terminal moraine of this former glacier which blocks the end of the Wakatipu basin. The outflow from the other end of the lake — the Kawarau Falls — give rise to the Kawarau River which was seen again at Cromwell. This old goldmining town is situated at the confluence of the whitish-blue Clutha and darker Kawarau Rivers.

After cooling off on the Coronet

Peak ski-tow at over 5,000 ft., a spell in Queenstown allowed members to choose their own sightseeing tours in this picturesque town. The final stages of the trip had now been reached, and Mt. Cook — New Zealand's highest mountain (12,349 ft.) — was the remaining area left to visit before leaving New Zealand via Christchurch. Much of the journey to this national park was through tussock grassland where Spaniards (*Aciphylla* species) and the Wild Irishman (*Discaria toumatou*) were abundant. Both these plants are extremely inhospitable, the former having piercing needle-like points to their long leaves, and the latter consisting of a mass of sharp, hard spikes. It is not fully understood why large areas of tussock land exist in this part of New Zealand. It is not, as sometimes stated, due to repeated burning off of vegetation by farmers. Possibly fires in Pre-European times may have played a part together with the climate. Research shows that in the past the area supported forest trees. It remains one of the many New Zealand botanical puzzles still to be solved.

From Lake Pukaki Mt. Cook's snow-clad peaks stood out against a blue sky and it was hard to realize that this mountain was only a few miles from Fox Glacier. By road it is more than a 200-mile journey. One of the difficulties when touring N.Z. are the long distances which often have to be driven on winding roads in order to reach places which are really close together. Few roads cross the rugged mountains from east to west.

As with Egmont, the weather was deceptive and the day in the Mt. Cook National Park was wet and cold. In spite of the very bad conditions all managed to see something of interest. The track to Kea Point even in rain, gave a spectacular view of the retreating Mueller Glacier (named by geo-

logist Sir Julius von Haast in honour of the Directors of Melbourne's Botanic Gardens). Less than fifty years ago this track lead to glacial ice, but today it looks down on a rock debris chasm with walls of lateral moraine, giving the impression of a "moon landscape". The threatening echoing roars of crashing avalanches could be heard from time to time, but rain and cloud prevented any from being seen. Governor's Bush — a beech forest area — provided plants of interest. An excursion to the Red Lakes and up the ridge of Mt. Sebastopol failed to reveal any of the large Mountain Sheep. These are species of *Raoulia* and *Haastia* which grow on rocky mountain slopes where they experience extremes of climate. Composites, they form oval to rounded compacted masses up to two metres across, with woolly densely packed leaves which from a distance look like sheep. During the winter they are often covered by several feet of snow. However in spite of the failure to find this "evolutionary wonder", the trip was worthwhile because alpine flowers and shrubs were prolific. *Gentians* and *Helichrysums* were in bloom and the giant mountain buttercup (Mt. Cook "Lily") — *Ranunculus lyallii* was just at the end of its flowering season. This plant has saucer-shaped leaves up to 20 cm across and is the largest *Ranunculus* in the world, as it can grow to 1.5 m in height. The low Snow Totara (*Podocarpus nivalis*) with its red swollen fleshy bracts supporting a nut-like seed, together with the mountain celery pine (*Phyllocladus alpinus*) formed the most conspicuous part of the vegetation. In the shelter of these shrubs were many delicate flowers. The alpine regions of N.Z. have many interesting plants and one of these is the pigmy pine (*Dacrydium laxifolium*). This prostrate Gymnosperm forms mats over rocks and is the smallest pine in the world.

The following day the sun shone once more as the bus headed for Christchurch. An enormous amount had been seen in three weeks and although confusion still existed over tricky Maori plant names such as mingi-mingi, mange-mange, and hange-hange, everyone had learnt a great deal and had enjoyed a wonderful tour.

There are a number of general points of interest concerning New Zealand. Firstly national parks are well established. Land areas were set aside in 1840 "for public enjoyment" and in 1887 the first national park came into being. This consisted of three mountain peaks — Tongariro, Ruapehu and Ngauruhoe — which were given by Maori chiefs to the nation as "a national park for the benefit of everybody". Today there are ten national parks covering about one-twelfth of the total New Zealand land area, which is more than in any other country. Wilderness areas where access is restricted to foot tracks have also been established. In 1971 the national parks together with 935 scenic reserves, 45 bird sanctuaries and 63 historic reserves totalled some 6,185,000 acres, and over the last two years this area has been increased.

New Zealand is long and narrow. It passes through 13° of latitude and no part is more than about 70 miles from the sea. The country is mountainous — 16 peaks exceed 10,000 ft., while at least 223 named peaks are of 7,500 ft. or more. The rainfall is varied — from about 12 in. per year in Central Otago to over 300 in. per year in parts of the Southern Alps; in Fiordland rain is recorded on more than 200 days each year. These conditions all lead to the wide range of habitats which in turn lead to a varied flora.

New Zealand has a large number of endemic plants. There are approximately 1,900 species from ferns upwards; of these 79% are endemic. The

alpine herbfield areas of New Zealand have over 600 different species of plants, 94% of which are endemic. The flora shows affinity to South America, Malaya and Australia. It is thought that New Zealand may have been connected to South America via the South Pole. The similarity between New Zealand and Australian floras is not as great as one would expect. There are about 250 species common to both countries, but of these one-quarter are of fairly world-wide distribution. No native *Eucalyptus* species occur and it is probable that New Zealand became separated from Australia at a time when the Eucalypts were restricted to the West, and an inland sea prevented their spread across to the East. New Zealand's long isolation (possibly more than 60 million years) from other land masses has allowed time for many new species to develop.

There are no mammals except marine ones, and two species of bats. Again the reason for this can be traced to New Zealand's early separation when mammals were just beginning to evolve. The bats were probably blown across from Australia. Because of the absence of mammals the birds had no enemies, and hence flightless ones were at no disadvantage as regards predators. Thus over a long period of time a number of different types of birds with absent or degenerate wings developed. There was no competition from grazing mammals and hence some birds such as the Notornis and extinct Moa, took over this ecological niche. Even one species of bat shows reduction in flying and at times uses its folded wings as legs.

Reptiles are present (e.g. geckos, skinks and the living fossil — Tuatara) but no land snakes. This seems to be due to the fact that snakes are a more recently evolved reptilian line, and developed after New Zealand's separation.

Another feature of the flora is the large number of plants (over 200) which have juvenile leaf forms. Some of these may persist up to 50 years before developing adult foliage. The lancewood (*Pseudopanax crassifolium*) is one tree which has a striking young stage — long narrow serrated leaves arising from a single unbranched stem. Others, such as the Maori Jasmine, pass through innumerable leaf shapes as the plant grows.

The arrival of the Pakeha together with his animals, caused drastic changes in the fauna and flora. Many species have become extinct or nearly so, and forests rapidly disappeared. In some places native plants have become induced weeds, e.g. bracken (*Pteridium esculentum*) and scented fern (*Paesia scaberula*) take over when land is cleared. Much irreversible damage has been done, but today awareness of the situation may help to prevent too many future mistakes.

The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name

[continued from 90 (6)]

by JAMES A. BAINES

Gentianella. From *Gentiana*, which was named by Linnaeus after King Gentius of Illyria, who in 168 A.D. allied himself with King Perseus of Macedonia but was captured in battle against the Romans the following year. Placing the annual and biennial gentians in the separate genus *Gentianella* by European botanists is not widely accepted by American botanists — the suffix -ella is often used as a diminutive or to differentiate allied genera.

Gleichenia. Named by Smith after Friedrich Wilhelm von Gleichen (1717-1783), a German botanist interested in microscopical studies. He was a baron.

Goodenia. Named by Smith after Rev. Samuel Goodenough (1743-1827), Bishop of Carlisle. Treasurer of the Linnean Society and F.R.S., he wrote on seaweeds and sedges.

Goodia. Named by Salisbury after Peter Good (died 1803), a Kew gardener who went with Robert Brown

in the *Investigator*. Flinders lost four men in Sydney from dysentery contracted on the voyage, among them Good, who was praised by Banks for his diligence and ability. He had previously gone to Calcutta in 1796 to bring back plants collected by Christopher Smith.

Grevillea. Named by Robert Brown after Charles Francis Greville (1749-1809), a founder of the Horticultural Society of London and a vice-president of the Royal Society. He introduced and grew rare plants.

Gunnia. Gunn's Orchid or Butterfly Orchid was named *Gunnia australis* by Lindley in 1834 after Tasmanian collector Ronald Campbell Gunn, born in Cape Town 1808, died Launceston 1881; F.L.S., F.R.S. Lindley renamed it *Sarcochilus parviflorus* four years later, and the valid name now is *S. australis*. It is ironic that so many plants retain the specific name

gunnii after this indefatigable amateur botanist, but *Gunnia* as a generic is superseded. (F. Mueller's *Gunnia* in Aizoaceae is now *Neogunnia*.) The epithet *gunnii* survives in such genera as *Chiloglottis*, *Cladium*, *Cyperus*, *Scirpus*, *Acacia*, *Asperula*, *Eucalyptus* (Tasmanian endemic), *Helichrysum* (Tas.), *Phyllanthus*, *Pultenaea*, and *Senecio*, as well as other Tasmanian endemics, while *gunniana* and *gunnianum* survive in *Carex*, *Deyeuxia*, *Epilobium* and *Ranunculus*.

Haeckeria. Named in 1852 by F. Mueller, presumably after a German, Haecker. The name was restored in 1967 for two species long known as *Humea*, a third species of the latter genus reverting to *Calomeria*, a name that had priority in 1804 by only three months.

Hakea. Named by Schrader after Baron Christian Ludwig von Hake (1745-1818), a German patron of botany, and councillor in Hanover. Usually pronounced in the eastern States with the first syllable sounding like the European fish hake, the German pronunciation would support those who say hahk.

Hardenbergia. Named by Bentham after Franziska, Countess von Hardenberg, sister of Baron Carl A. A. von Hügel (1795-1870), Austrian patron of horticulture and traveller. Baron von Hügel collected in Western Australia in 1833, and also in the Philippines. Baron A. von Hügel, his son, came to Australia after succeeding to the title, and in 1874 made collections of birds while staying with the Richardson family at Harmony Vale, Olinda Creek, in the Dandenongs (see N. A. Wakefield's paper, *Vict. Nat.* 89, 156-164, June 1972). Species named after the father, e.g. *Gompholobium huegelii*, have an extra letter e after the u to represent the umlaut diaeresis as used in the German surname.

Hibbertia. Named by Andrews after George Hibbert (1757-1837), who supplied plants for his work on *Geraniaceae* from his private botanic garden at Chelsea. He sent Niven to the Cape and Macfadyen to Jamaica for new plants to propagate. He employed as gardener, nurseryman and collector Joseph Knight, who wrote on the *Protea* genus (1809), although the N.Z. Proteaceous genus *Knightia* was named by R. Brown after Thomas Knight, a friend of Sir Joseph Banks.

Hovea. Named by R. Brown after Anton Pantaleon Hove (fl. 1785-1798), a Polish botanist from Warsaw, who became a collector for Kew Gardens on the instructions of Sir Joseph Banks in West Africa, India and the Crimea.

Howittia. Named by F. Mueller in 1855 after Dr. Godfrey Howitt, a Melbourne doctor, interested in Botany, born 1800, died 1873. An original member of the council of Melbourne University, and a founder of what became the Royal Society of Victoria, he was an authority on entomology, many of his new species of insects being named by overseas experts. He owned land near Caulfield farmed for a time by his more famous nephew, Alfred William Howitt, the explorer-naturalist who found King, survivor of the Burke and Wills expedition.

Humea. Named by Smith after Lady Amelia Hume (1751-1809), wife of Sir Abraham Hume, F.R.S., of Wormleybury, Herts., and a pupil of Sir James E. Smith. (Now superseded by *Haeckeria*, q.v., and *Calomeria*.)

Hutchinsia. After Ellen Hutchins (1785-1815), of Bantry, Ireland, who was accomplished in cryptogamic botany, and made contributions to *English Botany* journal. (Now *Cuphonotus* and *Hymenolobus*.)

(To be continued)

Chaetal Striations in Burrows of *Notoscolex shephardi* Spencer

by

G. BLACKBURN*

Considerable information is available on earthworms and their activities, but there appears to be no record of the impressions of chaetae on the walls of their burrows. The fact that under some conditions these markings are clearly preserved may be useful in helping to identify worm burrows in soil.

Parallel striations along the walls of vertical channels, approximately 4 mm diameter, were observed commonly at depths of 1 to 1.5 m in clay soils with gilgai microrelief in western Victoria in 1970. The numerous channels were seen in the walls of

excavations to 2 m, but earthworms were rarely observed, probably due to their disturbance by the back-hoe machine used for the work and the exposure of the subsoil to light. The pattern of striations on a short length of channel wall is shown in Plate 1.

The striated channels were submitted for biological examination and opinion was obtained that they were likely to be made by earthworms. The only live earthworm noticed at the excavations was 80 to 100 mm long, 7 mm in diameter, and dark in

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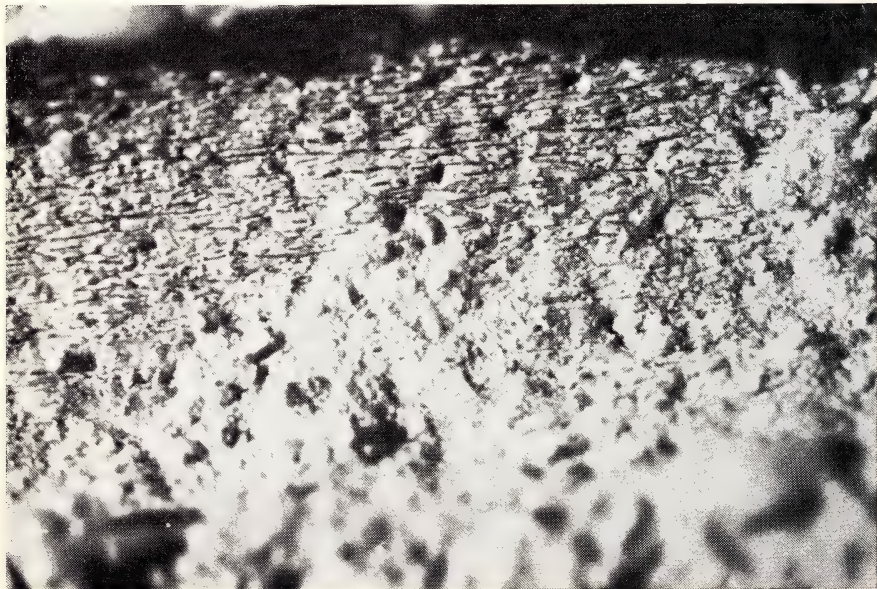


Plate 1. Parallel striations and worm casts on approximately 10 mm length of earthworm burrow in gilgai clay subsoil at Miram South, Victoria.

colour. Specimens obtained subsequently from nearby soil were identified by K. E. Lee (pers. comm.) as *Notoscolex shephardi* Spencer. This species was established by Spencer (1900) from specimens collected near Horsham, also in western Victoria. The disposition of chaetae on the segments of the species agrees with the striations found on the channel walls and it was concluded that they were made by this species of worm.

The field observations were made in September and the gilgai clay soils were then moist to depths of at least 2 m, the maximum depth of excavation. The walls of the burrows consisted of fine-grained material on which the striations were clearly shown. The pattern of these markings was occasionally broken, apparently

due to masking by worm casts. This interruption of striations is shown in Pl.1.

The burrows of *Notoscolex shephardi* are smaller in diameter than those of some other megascolecid earthworms, and the fact that the chaetal markings were noticeable under field conditions indicates the scope for observing these and other micromorphic features without recourse to laboratory or microscope.

Acknowledgement

Dr. K. E. Lee commented on the cause of the striations and identified the live earthworms collected by Mr. A. Coutts of Yanipy, Victoria.

REFERENCE

Spencer, W. B. (1900). Further descriptions of the Australian earthworms. *Proc. R. Soc. Vict.* **13**(1): 29-67.

Varied Menus

by

JEAN GALBRAITH

For years wild birds have come to feed in my garden, both on natural foods (insects, fruit, flower nectar, etc.) and that placed on the bird-table and in nectar bottles. "Nectar", as provided for them consists of a moderately weak mixture of brown-sugar and water. If too weak they do not return after the first one or two sips unless they see me add sugar. The accepted mixture is honey and water, but that is impractical here as bees smell the honey and crowd round it so thickly that birds cannot reach it, while they (the bees) take no notice of sugar and water. On a cold, wet day the two bottles may have to be refilled three times — one is a large tomato-sauce bottle; one a milk bottle.

A "pudding" of brose meal, etc., is a failure. Possums tear it down on the first night. Food from the table is removed at night, and wire protects the nectar bottles from large birds and possums. The larger birds take nectar from dishes.

My birds get only mild cheese, but a friend who puts out both says that Blue Wrens will eat every crumb of tasty cheese before tasting the mild.

Many of the birds eat a wide variety of foods, but none so great a variety as the Satin Bower-birds, and none so small a variety as Spinebills and Yellow-winged Honeyeaters. A friend has seen Yellow-wings feeding nestlings on insects taken from a spider web, but over 20 or more years

I have never seen them take any solid food. They take my synthetic nectar very freely indeed, and if there is juice on the surface of fruit that other birds have been eating they will lick it off, but never peck at the flesh as other species do. I have watched them feeding on flowers, especially gum blossom, but (in view of Dr. Churchill's records of feeding Lorikeets) I would not define their food. They may eat nectar or pollen or insects, or all three. Certainly the Yellow-wings must get insects somewhere, for in a good season they nest almost continuously and, like all honeyeaters I know, their nestlings are fed on insects.

I have never seen a honeyeater eat a flower for the sake of the nectar in it as parrots do. They are equipped for licking not chewing.

When eucalypts are flowering the Honeyeaters go to them in preference

to the nectar bottles. So long as it does not rain the flowering tree will be crowded while only one or two birds come to the sugar and water. Rain evidently washes out or dilutes the floral nectar and then the birds prefer the sugar mixture.

The confidence of birds here has taught me other things. I should not have expected them to notice differences between people. Sudden or decisive movement disturbs any bird, but even if visitors move quietly the birds are less confident with others than with me. They will not come to the window for food if anyone else stands too near it, though a room full of people does not disturb them provided I am the only one close to the window. When there are visitors they seem to be reassured by quiet conversation though used to silence when I am alone.

* * *

Of the birds listed below a yellow-tufted honeyeater was here for ten days, spending much of each day on the bird-table at the window, but has not been seen since. Those marked (A) come nearly every day, off and on all day. (S) indicates regular visitors in season (spring-autumn or autumn-spring). The others come intermittently. Foods listed are only those I have seen the birds taking — unmistakably. ? = not sure; † = never seen taking this. Only birds that come to the bird tables and/or nectar bottles are listed. In the list below * = soaked and sweetened only, so far as I have seen; f. nectar = nectar from flowers; f-juice = fruit juice as distinct from fruit flesh.

Brown Thornbill — bread, cake, cheese, coconut, fat, insects, nectar.

Blue Wrens — bread, cake, cheese, coconut, fat, insects, nectar†.

White-browed Scrub-wren — bread, cake, cheese, coconut, fat, insects, nectar†.

Yellow Robin — bread, cake, cheese, coconut, fat(?), insects, nectar†.

(S) Silvereye — bread*, cake*, cheese(?), coconut(?), fat, insects, nectar.

(A) Yellow-faced Honeyeater — bread, cake, cheese, coconut, fat(?), insects, nectar, f. nectar, f-juice, fruit.

(A) White-eared Honeyeater — bread, cake, cheese, coconut, fat, insects, nectar, f. nectar, f-juice, fruit.

(A) White-naped Honeyeater — bread, cake, cheese, coconut, fat, insects, nectar, f. nectar, f-juice, fruit.

- (A) Yellow-winged Honeyeater — bread†, cake†, cheese†, coconut†, fat†, insects, nectar, f. nectar, f-juice, fruit†.
 Yellow-tufted Honeyeater — bread(?), cake(?), cheese, coconut(?), fat(?), insects, nectar, f. nectar, f-juice(?), fruit(?).
 Eastern Spinebill — bread†, cake†, cheese†, coconut†, fat†, insects, nectar, f. nectar, f-juice(?), fruit†.
 Noisy Miner — bread, cake, cheese, coconut(?), fat(?), insects, nectar f. nectar, f-juice, fruit.
- (S) Red Wattle-bird — bread, cake, cheese(?), coconut(?), fat(?), insects, nectar, f. nectar, f-juice, fruit.
- (S) King Parrot — potatoes, all sorts of fruit (including tomatoes), acorns. Prefers feeding on ground and comes more often to bird bath than bird table.
- (S) Crimson Rosella — crushed acorns, most fruits and seeds, especially sunflower seed, flowers containing nectar.
 Eastern Rosella — all fruits and berries, docks and other seeds, f. nectar, bread, cake, etc.
- (S) Sulphur-crested Cockatoo — seeds (tearing apart pine cones or pears with equal ease to get them), onion grass bulbs.
 Gang Gangs — Hawthorn berries (not seen on bird table but yearly visitor to nearby Hawthorn).
- (S) Harmonious Thrush — cheese, bread, fat, meat, grubs and insects.
 Golden Whistler — cheese, bread*.
- (S) White-throated Tree-creeper — cheese, coconut, fat.
 A Magpie — meat, fat, bread, cheese.
- (S) Pied Currawong — meat, fat, bread, cheese(?), fruit.
- (S) Satin Bower-bird — bread, cake, cheese, coconut, fat, insects, nectar, fruit and berries (all kinds), vegetables (carrots, pumpkin, marrow, silver beet), sugar, leaves (especially forgetmenot), sunflower seeds, meat, greenhood tubers, flowers (if containing nectar) — Pittosporum fruits a special delicacy.

Club Archives

Council feels that it is important that historical material relating to the Club should be collected and preserved, and accordingly Mr. Barry Callinan has been appointed Archives Officer.

If any members have material which they feel may be of interest to the Club, would they please send it to Mr. Callinan. Arrangements will be made to copy any interesting items which members would prefer to retain.

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Discovery of Tentaculites in the Limestone at Tyers, Gippsland

by BARRY J. COOPER

Tentaculites are small straight conical shells, which occur in large numbers in rocks of Silurian and Devonian age. Although recognised as long ago as 1852, it has only been in the last fifteen years that their value in age determination has been realised.

Chapman (1904) was the first to describe representatives of the group in Victoria. Gill (1941) re-described these forms and illustrated new material.

The present note describes a few well preserved specimens of *Turkestanella acuaria* (Richter), discovered in the Devonian limestone at the old Tyers Quarry on the E. bank of the lower Tyers River, north-west of Traralgon, in Gippsland. The age significance of the specimens is discussed, with reference to the already documented conodont fauna.

GEOLOGICAL SETTING

The Devonian limestone at Tyers constitutes part of the limestone/conglomerate association found at the base of the Walhalla Group in this area. Philip (1962) introduced the name, Coopers Creek Formation to describe this unit and the only subsequent studies are unpublished B.Sc. (Hons.) theses by B. Golding and C. Wilman at the University of Melbourne, 1971.

Philip (1962) also gave an account of the then known fauna of the Coopers Creek Formation and the underlying Boola Beds at Tyers. In a subsequent paper, Philip (1965), he described the conodonts. As a result of these extensive works, the rich

Tyers fauna has become one of the best known Lower Devonian sections in the State.

Considerable uncertainty exists, however, as to whether an unconformity occurs between the Coopers Creek Formation and the Boola Beds. Strusz (1972), p. 440, summarises the questions related to this problem.

AGE SIGNIFICANCE OF THE TENTACULITES

Turkestanella acuaria is known from the uppermost part of the Lochkovian to the top of the Pragian stage in Bohemia (Bouček 1964). More recent work in North America by Churkin and Carter (1970) and Ludvigsen (1972) confirms this range. In relating this to the Rhenish stages, which are more commonly used in Victoria, a range of Middle Siegenian to the top of the Lower Emsian, is considered equivalent.

Forms attributed to *Turkestanella acuaria* have been recorded by Talent (1965), 3,500 feet stratigraphically below the Coopers Creek Formation. Hence, the age of the specimens described here is unlikely to be older than Upper Siegenian.

Tiny teethlike micro-fossils called conodonts provide the most accurate dating of Devonian sediments at present. Conodonts described from Tyers (Philip 1962) are recognised by the writer as being of late Siegenian age, thus being in accord with the tentaculite determination.

This conclusion is based on the observation that some specimens of the conodont, *Spathognathodus sulcatus*

illustrated by Philip, closely resemble the Emsian form, *Spathognathodus trilinearis* (Cooper, in press).

SYSTEMATIC PALAEONTOLOGY

Class—TENTACULITA Bouček 1964

Order—DACRYOCONARIDA Fisher 1962

Family—NOWAKIIDAE Bouček and Prantl 1960

Genus—Turkestanella Klishevich 1968

Type Species—

Tentaculites acuarius Richter 1854, p. 285, pl. 3, fig. 3-7.

Turkestanella acuaria (Richter 1854)

Nowakia acuaria (Richter) Bouček 1964, p. 60,

Pl. 1, fig. 1-8
Pl. 2, fig. 1-18
Pl. 3, fig. 1-7
Pl. 4, fig. 1-4

Churkin and Carter 1970, p. 62
Pl. 16, fig. 1-8

Turkestanella acuaria (Richter) Ludvigsen 1972, p. 309,
Pl. 1, fig. 1-13
Pl. 3, fig. 3-6

(The reader is referred to Ludvigsen 1972 and Bouček 1964 for a complete synonymy.)

DESCRIPTION — Conical shells up to 1.0 mm in length. The maximum width is about 0.4 mm and the apical angle about 10°.

The initial chamber is 0.1 mm wide and is separated from the remainder of the shell by a constriction. It is ornamented by longitudinal sculpture, which can be traced into the more distal parts of the shell. Transverse ornament is lacking.

The remainder of the shell is characterised by clearly defined transverse rings and a nearly constant

number of longitudinal striae. These rings are more closely spaced near the initial bulb.

REMARKS — Bouček (1967) recognised two sub-species of *T. acuaria* in the Australian region. However, full

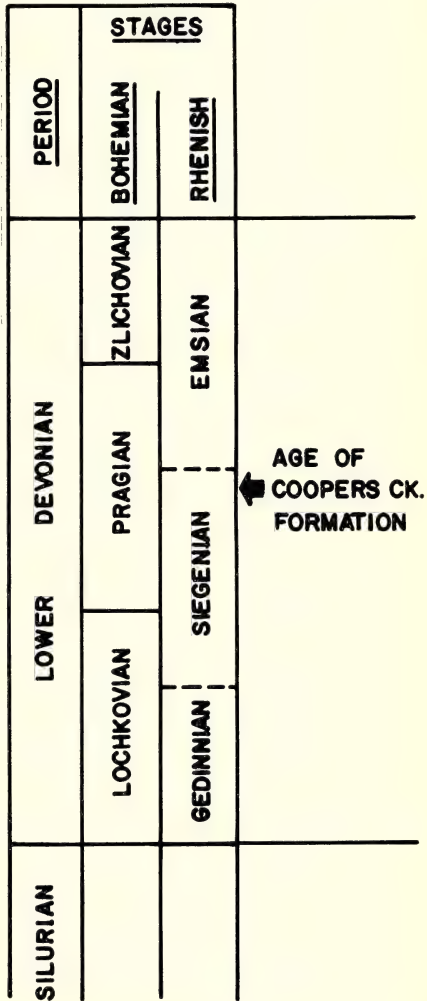


Fig. 1—Chronological scale for the Lower Devonian showing the age determined for the Coopers Ck. Formation at Tyers.

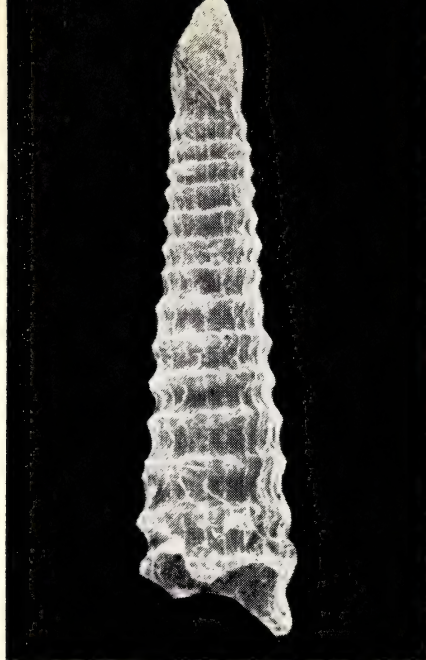


Fig. 2—*Turkestanella acuaria* (Richter), Scanning Electron Micrograph, x 100.

descriptions and illustrations were omitted, so no comparison can be made here.

The specimens of *T. acuaria* in the author's collection are smaller in size in comparison with other material described. This fact is attributed to preparation technique, which was designed to recover conodonts. Laboratory procedure included crushing, acetic acid treatment and retention of the residue fraction collected between a 7 and 100 mesh screen.

The above note is, in no way, a complete study of the Tyers tentaculite fauna. One poorly preserved fragment suggests that Styliolinid tentaculites are also present. Tentaculites were only recovered from sample Ty-5 of the section collected. Bulk material from this section, as well as the specimens described herein, are stored in the collections of the School of Geology, University of Melbourne.

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Prehistoric Cracks in Alluvial Deposits

by EDMUND D. GILL*

"Cracks in alluvium indicate the presence of stresses that are sufficiently large to rupture cohesive deposits." In this way, William B. Bull (1972) began his U.S. Geological Survey Professional Paper on prehistoric cracks in Western Fresno County, California. When the California Aqueduct was being built, thousands of clay-filled tension cracks were found in the alluvial fans of the San Joaquin Valley. The question was raised whether these were a threat to the canal, so they were studied. Bull discovered that cracks in the big alluvial fans presented no danger because they were formed in prehistoric times. Some of the cracks are over 6,000 years old.

I found this paper of considerable interest because prehistoric cracks occur in some Australian alluvial deposits, but no one appears to have studied them. This note is to record an unusually well documented one from Queensland.

Darling Downs

Ancient cracks were found on the Darling Downs in southern Queensland. At the request of the Australian Institute of Aboriginal Studies, I investigated a site at Canning Downs near Warwick. The place was near a well E.S.E. of the homestead on an alluvial terrace beside the Condamine River. Giant extinct marsupials have been found in the sediments of this terrace, and the site on King Creek is famous.

A bulldozer trench 45 m long bearing 163° was dug to a depth of 6.7 m (22 ft.). The profile thus exposed was:

0 -0.76 m—Black (5YR 2/1 moist) friable soil. Heavy cracking in montmorillonite clay; patches of earthy carbonate.

0.76-6.7 m—Dark reddish brown (5YR 3/2 moist) clayey silt to clay with carbonate as earthy patches and nodules. Black traces to 1.5 m due to black soil migrating down ancient cracks. Vertical cleavage. Very compact, so that the ripper had to be used before the bulldozer could move the alluvium. The bulldozer blade was 3 m wide.

On 25 April, 1964, soon after the trench was completed and just after people had inspected it, about 20 tonnes of sediment fell from the west wall. The slip was about 10 m long and 6 m high; it involved approximately 0.3 m thickness of terrace material. The face from which the sediment fell was vertical and without slickensides. It was covered with black soil. Fissures up to 1.5 m were common, but this one was over 6m deep.

The crack was clearly ancient, but younger than the black soil that filled it. In the same district, detailed geology was investigated in connection with the Talgai Cranium, and this suggested that the crack was not more than 6,000 years old. At some time in the Holocene, the clay dried out to a depth of more than 6 m, thus causing the crack. Black soil from the surface filled it. Upon re-wetting of the

*Deputy Director, National Museum of Victoria.

clay, it swelled, and compressed the black soil into a narrow seam that nonetheless marked a plane of weakness. By a coincidence, the bulldozer trench was cut near it and parallel to it, resulting in the rock fall. It was fortunate that the people had left the trench before the fall occurred.

If the funds had been available, black soil from the fissure would have been collected for a radiocarbon dating. There would be sufficient organic matter in the soil to permit a date to be assayed.

Victoria

Ancient cracks occur in Quaternary formations in Victoria, but it is rarely that a bulldozer trench is available to permit their adequate study. Cracks

along river cliffs (e.g. Nampoo Station, Cal Lal, southwest N.S.W., on the Murray River) and along sea cliffs (e.g. between Warrnambool and Childers Cove, Western Victoria) are common. Some are very old, but most are difficult to date. However, at Wilson's Crack near Childers Cove there is an Aboriginal midden at the top of the high cliffs, suggesting that the Aborigines climbed up through this fissure (as fishermen do now) to attain the cliff top. This fact, and the structure of the fissure, suggests that it is very old.

REFERENCE

Bull, W. B. 1972. Prehistoric near-surface subsidence cracks in Western Fresno County, California. *Geol. Surv. U.S.A. Prof. Paper* 437-C.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

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The Marine and Estuarine Molluscs of French Island

by BARBARA J. NIELSEN*

French Island lies to the north of Phillip Island in Westernport Bay. It is the larger of the two islands with an area of 16,900 hectares (42,000 acres). Although it has been settled since 1850, as far as is known, no survey of the littoral zones of the island had been made until January, 1972, when a party from the National Museum of Victoria, led by Dr. B. J. Smith, Curator of Invertebrates, visited the island for this purpose. This report, as indicated in the title, is of the marine and estuarine molluscs collected on this visit. It forms an adjunct to the wider survey of the littoral areas of Westernport Bay made by the Marine Study Group of Victoria in which the author took part. An interim report of this survey was published in August, 1971.

The visit to French Island lasted four days, from the 21 to the 24 January 1972. During the whole period the weather was fine and sunny. There had been no rain for some time. The time factor and the distribution of the access roads meant that most of the survey was conducted on the western and southern coasts of the island. In all ten localities were visited.

THE ISLAND

According to Jenkin 1971, the bed-rock of the island is probably of Silurian sedimentary rock. This is overlain by Tertiary sediments in the central part of the island and on the southern coast by small areas of volcanic rock (basalt) of the Narracan series.

The coastline consists mainly of large areas of mud or sandy mud with numerous stands of the White Mangrove (*Avicennia marina*). In places, for example on the beach 0.8 kilometre north of Tortoise Head, there were stands of dead trees held in the mud at about high water mark, which, it is assumed, are the remains of stands of *A. marina*.

According to local inhabitants during winter the whole island seems to be "floating" on a sea of mud. This is easily believed as, in many places, particularly on the northern and western coasts the "beach" is separated from the higher parts of the island coast by a wide area of salt marsh. Our informants told us that this area is water-logged in winter and also covered by the "King Tides". On the southern coast there are several relatively small rocky outcrops of basalt where, in general, the wide marsh area is missing.

THE LITTORAL AREAS

For convenience, the littoral and related habitats are divided into six main categories:—

- (a) the coastal salt marsh of the littoral fringe on the western and northern coasts, separating the beach from the rest of the island;
- (b) tidal mud flats uncovered at low tide often with stands of the White Mangrove (*Avicennia marina*) either living or dead;

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- (c) tidal sandy mud and muddy flats with extensive eel grass beds, usually with a shallow water cover;
- (d) isolated rocky areas, mainly on the tidal mud flats, but sometimes on sandy mud, increasing in area near the rock platforms;
- (e) wave cut platforms of fresh and weathered basalt which were found only in two areas — at Tortoise Head on the south-west tip of the island and near the landing place, west of the barge mooring;
- (f) the banks of tidal streams—these differ from the other five areas in that they are inland but support a population of estuarine animals.

LOCALITIES COLLECTED

Below is a list of the localities where collections were made together with the grid references from the army ordinance map of the Queenscliff area reference number SJ 55-9, ed. 1, series R 502.

A. Areas with access from the west coast, listed from north to south.

1. Salt marsh at the North Pines Pastoral Company (C. C. Fisher): Grid ref. 333 278.
2. 0.8 kilometres north of Fairhaven Jetty: Grid ref. 332 375.
3. 2.1 kilometres north of the bridge at the junction of the Tankerton and Coast roads, near the Coast road: Grid ref. 331 268.
4. The banks of the creek at the bridge at the junction of the Tankerton and Coast roads: Grid ref. 331 268.
5. 0.6 kilometres north of Tortoise Head: Grid ref. 331 266.

B. On the south coast.

6. Tortoise Head: Grid ref. 331 265.
7. Chesapeake: Grid ref. 335 265.
8. Long Point: Grid ref. 334 268.

9. (a) The landing point — mud flats to the east of the barge landing place.
- (b) The landing point—rocks to the west of the barge landing place.

Grid reference for both these points is 334 268.

It should be noted that in most cases several habitats were sampled at each locality. The localities will be referred to by the numbers given in the above list in both text discussion and the systematic list below (Fig. 1).

THE MOLLUSCAN ASSOCIATIONS

- (a) The salt marsh of the supra-littoral fringe. Localities 1, 2, 3, 5, 6, 7.

These areas supported large populations of amphibolid and elobiid molluscs, only a few species being present. The molluscs tended to congregate in low-lying areas under loose vegetation.

The dominant species were *Ophicardelus ornatus* and *Salinator solida*. Specimens of the latter were large, often the shell being covered with a layer of mud. In one place, on the track to Tortoise Head, small mud rings were seen in the damp areas. These were thought to have been *Salinator* egg rings.

In general the size of this species of *Salinator* was constant. However, at Chesapeake small and medium sized specimens were found in a small rivulet leading to the sea.

By the track to Tortoise Head another elobiid, *Marinula meridionalis*, and the succinid *Austrosuccinia australis* were found.

- (b) Tidal mud flats with stands of living and dead mangroves and uncovered at low tide. Localities 3, 7, 8, 9.

This habitat, a feature of the northern parts of Westernport Bay, supports two faunas — one mud dwelling, the other living on the trunks,

branches and pneumatophores of the *Avicennia marina*. In the latter habitat species such *Melarapha unifasciata*, *Cominella lineolata* and *Austrocochlea constricta* were found.

The mud, on the other hand, supports the bivalves *Mysella donaciformis*, an ubiquitous species, small individuals of *Laternula tasmanica* and occasional *Anadara trapezia*. Associated with this bivalve fauna are the carnivorous gastropod species *Polinices sordidus* and *Parcanassa burchardi*. *Salinator fragilis* was also found in large numbers.

(c) Mud and sandy — mud flats with extensive eel grass beds usually with a shallow water cover. Localities 2, 3, 5, 7, 9(a).

The fauna of the mud habitat in these areas was similar to that mentioned for the same type of substrate in (b). In addition the small bubble shell *Acteocina apicina* was found living on the eel grass. Empty shells

of another bubble shell, *Cylichna atkinsoni* were also found.

The sandy-mud habitat differs from that described above in that the upper layer of the substrate has a larger grain size and is light grey to yellow in colour. Beneath this layer of sandy mud, in some places, particularly locality 3, there is a layer of sub-recent, reworked shells, mainly *Katelsia rhytiphora*. This layer also outcrops at the surface near Tankerton Jetty.

Many species described for the mud areas also occur in this habitat although some of the bivalves are absent. *Mysella donaciformis* is again associated with the carnivorous species *Parcanassa burchardi* and *Polinices sordidus*. On the eel grass the small bubble *Cylichna atkinsoni* occurred together with *Eubittium lawleyanum*, *Salinator fragilis* and *Assimineia brazieri*. The last was only found at locality 2.

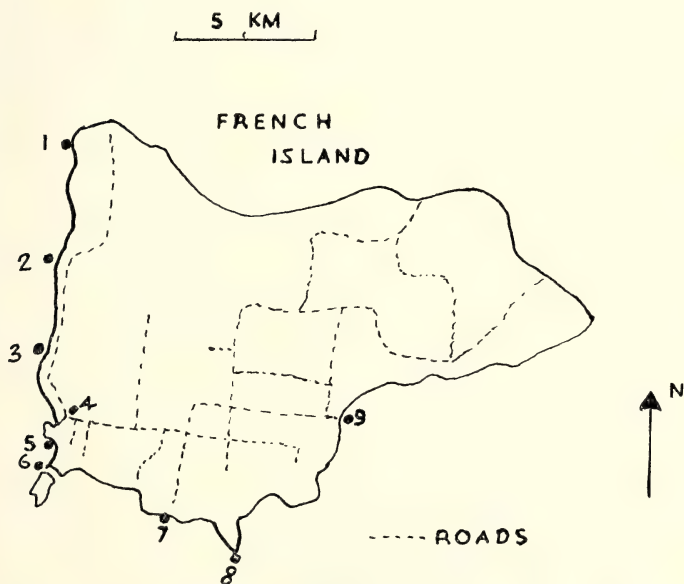


Figure 1

It is interesting to note that in the muddy areas where there was little if any eel grass the sand snail, *Polinices sordidus*, travels below the mud surface, whereas in areas where there is much eel grass it moves over the surface of the substrate.

(d) Isolated rocky areas. Localities 5, 7, 8, 9.

The only rock seen on the shores of the island was basalt. The isolated rocky areas usually consisted of basalt boulders resting on the mud.

The molluscan fauna of these areas was more varied although there were fewer bivalves than in the previous areas. Rock dwelling gastropods such as *Bembicium auratum*, *Cominella lineolata*, *Lepsiella vinosa*, *Austrocochlea constricta* and *Notoacmea scabrilirata* were found in most of these areas. Other species recorded from some points were *Melanerita melanotragus*, *Melarapha unifasciata*, *M. praetermissa*, *Onchidella patelloides*, *Barbatia squamosa* & *Modiolus pulex*. Some species attained sizes larger than for members of the same species in other areas of Westernport Bay. Another species, recorded only from Long Point was *Pseudoliotia micans*.

(e) Rocky wave platforms. Localities 6, 9(b).

Only one of the two basalt rock platforms, that at Tortoise Head, carried what might be described as a typical rock platform molluscan fauna for Westernport. Here *Hormosira banksii* was present.

At locality 9, on the rocky platform to the west of the landing place the fauna was limited to *Bembicium melanostomum* (the only place where this species was found), *Siphonaria* sp. cf. *baconi* and the bivalves *Ostrea angasi* and *Anadara trapezia*.

The platform at Tortoise Head had a large and varied molluscan fauna, typical of the rock platform fauna in other parts of the Bay. Gastropods and bivalves of this type of habitat were well represented although only three species of chiton were recorded — *Ischnochiton variegata*, *Acanthochiton bednallii* and *Ischnoradsia australis* and only one cephalopod, the Blue-ringed Octopus *Haplochaena maculosa*. In all forty species of mollusc were recorded from this area including two opisthobranchs, *Dendrodoris nigra* and *Spurilla maclaeyi* from under a loose rock and the bubble shell *Acteocina hofmani*.

Typical rocky platform species such as *Cominella eburnea*, *C. lineolata*, *Austrocochlea constricta*, *A. odontis*, *Melarapha unifasciata*, *Cosmetalepas*

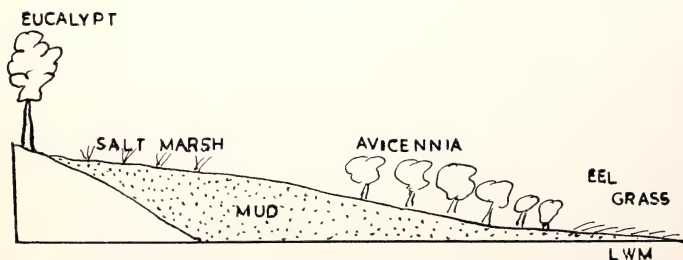


Figure 1.

Littoral and supra-littoral zonation (not to scale).



Plate 1.

Saltmarsh of
supra-littoral
locality 5.

concatenus, *Siphonaria diemenensis*, *Clanculus (Mesoclanculus) plebjus*, *Dentimitrella pulla*, *Dicathais textilosa*, *Subninella undulata* and *Floraconus anemone* formed the basis of the gastropod fauna. Among the bivalves were *Modiolus pulex*, *Barbatia squamosa*, *Mytilus planulatus* and *Venerupis exotica*. On nearby mud flats *Anadara trapezia* was found.

(f) The banks of a tidal creek.
Locality 4.

A small creek running to the shore was examined. The fauna of this

creek and its banks indicated that it was estuarine. The molluscan species were limited to *Ophiocardelis ornatus* on the banks with *Salinator solida* and *Assimineia tasmanica*. In the water was an unknown species of the family Hydrobiidae belonging to the genus *Potamopyrgus*.

DISCUSSION

Much of the littoral zone of French Island resembles that described for the littoral of the Northern Mangrove/Tidal Flats Province of Westernport described in the "Interim Report" by



Plate 2.

Saltmarsh of
supra-littoral.
Habitat of
Austrosuccinia
australis.

the Marine Study Group of Victoria (1971). The whole zone, including the supra-littoral salt marsh carries a limited and somewhat specialized molluscan fauna. The limited nature of this fauna is somewhat exemplified by the fact that only three species of chiton were collected and, of these, two were represented by one specimen each and the other, *Ischnochiton variegata* was very common, being recorded from four localities. According to Mr. R. C. Robertson, who identified the chitons, this was to be expected as this species favours a muddy environment. (Personal communication.)

Altogether five species were recorded on French Island but not during the survey of Westernport. These species were *Pseudoliota micans*, the three bubble shells — *Acteocina apicina*, *A. hofmani*, and *Cylichna atkinsoni*, and the bivalve *Venerupis exotica*. Another species recorded from the Island was found but not identified on the Westernport survey. This was the bivalve *Mysella donaciformis*.

It is difficult to assess the exact role of the molluscs of the Island in the total ecosystem of the Bay in that so little is known about the habits of

these local species. Comparisons can be made with overseas members of the same families but this is not always satisfactory as there is often great variation within the one family. In particular more information is needed on the feeding and breeding habits. Field observations made on general collecting excursions do enable some genera and species to be fitted into the overall food web, revealing the importance of the molluscs in this area. For example, *Parcanassa burchardi*, like all the Nassidae, is a carnivore and scavenger. *Polinices sordidus* is also a carnivore. Other gastropods such as the trochids and turbinids are herbivorous, helping to keep in check algal growth on rocks and mud, also the branches and pneumatophores of *Avicennia marina*. Of course, the bivalves are all filter feeders.

It is certain that during all seasons but winter the molluscs of this area would add considerably to the plankton of the surrounding waters by the discharge of gametes and the resultant developing larvae. Anderson (1962) has shown that *Bembicium auratum* and *Melanerita melanotragus* both have planktonic larvae. It is very



Plate 3.

Dead
mangroves (at
low tide)—
locality 5.

probable that many other gastropods also have planktonic larvae and certainly the bivalves would have the same. Thus this addition to the plankton would provide food for small fish and other marine organisms.

If the role of the molluscs is not always clear, the importance of French Island in the northern province of Westernport is very apparent. Hence the need to preserve undisturbed the entire habitat. The whole province is an area of natural reclamation, the mangroves and eel grass holding the silt and mud in position, helping it to build up so that finally the shore moves further out. The reclaimed tidal flats lose their mangroves and eel grass becoming salt marsh which eventually forms into paper-bark and eucalypt bushland (Fig. 2).

If the mangroves are killed by frost or man they revive slowly, if at all and in Corner Inlet and Westernport Bay erosion has developed where the mangroves have been removed by man

(Bird 1972). Obviously wholesale removal of the mangroves and also the eel grass, would result in the loosening of vast amounts of mud. This would be removed by erosion and probably deposited further down the bay. The net result of this would be that the shipping lanes would be blocked. Another more important result would be the alteration of the littoral areas of the Bay including the destruction of fish breeding grounds among the tidal flats. Thus the whole natural ecosystem would be disturbed and as a consequence both from the economic and scientific standpoint much harm would be done.

Acknowledgements:

The author wishes to thank the Director of the National Museum of Victoria, Mr. J. McNally, for allowing her to join the excursion; Dr. B. J. Smith for help both during and after the excursion and for reading the manuscript; Messrs. R. Burn and R. C. Robertson for identifying the opisthobranchs and chitons respectively and all others who helped the author.

Appendix

Below is attached a list of the species collected and the localities at which each was recorded. The basis for this list is Macpherson and Gabriel 1962.

Class AMPHINEURA (identified by R. C. Robertson)

- Family Cryptoplacidae — *Acanthochiton bednalli* (Pilsbry 1894) Locality 6.
 F. Ischnochitonidae — *Ischnochiton variegata* (H. Add & Angas 1964) Localities 6, 7, 8, 9(b).
 — *Ischnoradsia australis* (Sowerby 1840) Locality 6.

Class GASTROPODA

- Family Fissurellidae — *Scutus antipodes* (Montfort 1810) Locality 6.
 — *Montfortula rugosa* (Q. & G. 1834) Locality 6.
 — *Cosmetalepas concatenatus* (Crosse & Fischer 1864) Locality 6.
 F. Acmaeidae — *Notoacmea scabrilirata* (Angas 1865) Localities 5, 6.
 F. Trochidae — *Herpetopoma aspersa* (Philippi 1840) Locality 6.
 — *Austrocochlea constricta* (Lamarck 1822) Localities 3, 5, 6, 7, 8, 9(a).
 — *A. odontis* (Wood 1828) Locality 6.
 — *Clanculus (Mesoclanculus) plebjus* (Philippi 1851) Locality 6.

- F. Turbinidae — *Subnina undulata* (Solander 1786) Locality 6.
 F. Neritidae — *Melanerita melanotragus* (Smith 1884) Localities 6, 7, 8.
 F. Littorinidae — *Melaraapha unifasciata* (Grey 1826) Localities 3, 6, 7.
 — *M. praetermissa* (May 1908) Locality 7.
 — *Bembicium auratum* (Q. & G. 1834) Localities 1, 3, 5, 6, 8.
 — *B. melanostomum* (Gmelin 1791) Locality 9(b).
 Family Assimnidae — *Assimineia (Metassimineia) brazieri* (T. Woods 1876) Locality 2.
 — *A. tasmanica* (T. Woods 1876) Locality 4.
 F. Tornidae — *Pseudoliotia micans* (A. Adams 1850) Locality 8.
 F. Potamididae — *Zeacumantus diemenensis* (Q. & G. 1874) Locality 6.
 F. Cerithiidae — *Eubittium lawleyanum* (Crosse 1863) Localities 2, 3, 5, 6.
 F. Hipponicidae — *Antisabia foliacea* (Q. & G. 1835) Locality 6.
 F. Naticidae — *Polinices sordidus* (Swainson 1821) Localities 2, 3, 5, 6, 7, 9(a).
 F. Muricidae — *Lepsiella reticulata* (Blainville 1832) Locality 6.
 — *L. vinosa* (Lamarck 1822) Locality 5, 6.
 — *Dicathais textilosa* (Lamarck 1822) Locality 6.
 F. Columbelloidae — *Dentimitrella pulla* (Gaskoin 1851) Locality 6.
 F. Buccinidae — *Cominella eburnea* (Reeve 1846) Locality 6.
 — *C. lineolata* (Lamarck 1809) Localities 3, 5, 6, 8.
 F. Nassidae — *Parcanassa burchardi* (Philippi 1851) Localities 2, 3, 5, 6, 8, 9(a).
 — *Niotha pyrrhus* (Menk 1843) Locality 6.
 F. Conidae — *Floraconus anemone* (Lamarck 1810) Locality 6.
 F. Scaphanderidae — *Acteocina apicina* (Gould 1859) Locality 9(a).
 (ident. R. Burn) — *A. hofmani* (Angas 1877) Locality 6.
 — *Cylichna atkinsoni* (T. Woods 1876) Localities 2, 9(a).
 F. Dendrodoridae — *Dendrodoris nigra* (Stimpson 1855) Locality 6.
 (ident. R. Burn)
 F. Aleolidiidae — *Spurilla macleayi* (Angas 1864) Locality 6.
 (ident. R. Burn)
 F. Ellobiidae — *Marinula meridionalis* (Brazier 1877) Locality 5.
 — *Ophicardelus ornatus* (Ferussac 1821) Localities 1, 4, 5, 7.
 Family Amphibolidae — *Salinator fragilis* (Lamarck 1822) Localities 2, 3, 5, 6, 7, 8, 9(a).
 — *S. solida* (von Marten 1878) Localities 1, 4, 5, 7.
 F. Siphonariidae — *Siphonaria diemenensis* (Q. & G. 1833) Localities 5, 6, 8.
 — *Siphonaria* sp. cf. *baconi* (Reeve 1856) Localities 6, 9(b).
 F. Onchidiidae — *Onchidella patelloides* (Q. & G. 1832) Localities 6, 7.
 F. Hydrobiidae — *Potamopyrgus* sp. Locality 4.
 F. Succinidae — *Austrosuccina* sp. Localities 3, 5.

Class BIVALVIA

Family Arcidae

— *Anadara trapezia* (Deshayes 1840) Localities 6, 8, 9(b).

— *Barbatia squamosa* (Lamarck 1819) Localities 6, 7.

F. Mytilidae

— *Modiolus pulex* (Lamarck 1819) Localities 6, 7.

— *Mytilus planulatus* (Lamarck 1819) Locality 6.

F. Ostreidae

— *Ostrea angasi* (Sowerby 1871) Locality 9(b).

F. Montacutidae

— *Mysella donaciformis* (Angas 1878) Localities 2, 3, 5, 6, 7, 8, 9(a).

F. Veneridae

— *Venerupis exotica* (Lamarck 1818) Locality 6.

F. Hiotellidae

— *Hiatella australis* (Lamarck 1818) Locality 6.

F. Laternulidae

— *Laternula tasmanica* (Reeve 1818) Locality 7, 9(a).

Class CEPHALOPODA

Family Octopodidae

— *Haplochaena maculosa* (Hoyle 1883) Locality 6.

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Field Naturalists Club of Victoria

Day Group

17 May

Eighteen members were present at Wattle Park. During the group meeting, Mr. Fairhall gave a resume of the history of Wattle Park dating back to 1915. This was facilitated by information supplied by the Tramways Board who hold this area in trust and who have developed it into a fine, multi-purpose park.

Inspection commenced with a close study of the two fenced plots of native flora. Seen in flower to varying degrees were *Anigosanthos flavida*, *Bauera rubioides*, *B. sessiliflora*, *Brachysema lanceolatum*, *Calytrix fraseri*, *C. tetragona*, *Correa alba*, *C. glabra*, *C. bauerlenii*, *C. lawrencii*, *C. minor*, *C. reflexa*, *Crowea exalata*, *C. saligna*, *Crotalaria laburnifolia*, *Darwinia citriodora*, *Epacris longiflora*, *Eucalyptus caesia*, *E. torquata*, *E. woodwardi*, *Grevillea stenomera*, *G. victoriae*, *Hakea laurina*, *Melaleuca lateritia*, *Prostanthera cuneata*, *Thryptomene paynei* and *Westringia glabra*.

A circuit was made of the eastern side of the park, taking in children's playgrounds, areas planted to native trees (*Eucalyptus citriodora* dominant there) and an area reserved for indigenous trees. Fine views were obtained from an eminence of some 300 feet. Noted from here was the concentration of schools and child care institutions in the surrounding area.

Field Survey Group

Easter Camps

Over the Easter period, F.S.G. was represented by members at Hattah Lakes National Park, and others with the Hawthorn Juniors near Redcliffs. The extremely dry conditions yielded little apart from ants and spiders. Some species of fresh water molluscs and frogs were found in some of the lakes and dams of the district. Some members moved south and Arthur Brook travelled by land rover through parts of the Big Desert and Sunset country where he recorded evidence of breeding seasons for

some frog species. The Hawthorn junior members moved to Boundary Bend, and Leigh Winsor travelled to Horsham then through parts of the Grampians. In all, the country was interesting but produced few specimens for the group.

April

On the Thursday following the Easter break, fifteen members and friends attended the members' night. Those that had been away over Easter spoke on the country they saw and specimens they collected. Other members spoke on aspects of their field studies, and Tom Sault showed excellent photographs of native orchids, giving members some basic points about this interesting plant group. The evening finished with coffee and discussion.

May

The topic for the evening was Victorian frogs—behaviour and distribution, by Mr. Arthur Brook. Using clear diagrams and specimens, Mr. Brook explained the behaviour of some species of frogs and spoke on their distribution and problems associated with morphologically similar species. Of particular interest was the "Dial-a-Croak", an electronic device made by Mr. Brook that simulates the call of various frogs. The meeting closed with discussion and coffee.

Queen's Birthday Weekend (June Camp)

Eight members spent an extremely profitable weekend in the Buchan-Orbost area. The group was fortunate in having fine weather which facilitated survey work along the Omeo Highway to the Snowy River at McKellops Bridge. Here we spent a rather chilly night, and moved on to the Bonang Highway the following day.

Many specimens of millipedes and centipedes were collected by Al Burns and Max Campbell, and non-marine molluscs and planarians in fair numbers resulted in good sampling for the area. Of interest was the finding of *Atrax* species near the C.R.B. camp at Murrindal and finding of a freshwater sponge by Ros St. Clair at Little River.

General Meeting — 11 June

A large audience gathered to hear Mr. Jim Willis's talk entitled "Botanical Trails through Britain". His very varied collection of slides covering Britain in all seasons was accompanied by an informative and most interesting commentary, giving a glimpse of the history as well as the botany of the places he had visited.

A full list of Club correspondence as well as notices and press cuttings were displayed on the board at the back of the hall. The Secretary drew members' attention to the forthcoming meeting of the International Whaling Commission, and it was agreed that the Club would appeal to the Commonwealth Government for a vote in favour of a proposed international moratorium on whaling.

A plan of a new native plant garden to be established in the Oakleigh district was on display, and Mr. A. Fairhall was nominated to fill a position on the Committee of Management which was offered to a Club delegate.

A request was also received from the Commonwealth Serum Laboratories for assistance in collecting March Flies and Paper Wasps required for experimental purposes. Anyone interested in helping with this can obtain further details from the Serum Laboratories.

Among the exhibits were some very large specimens of the Basket Fungus, *Clethrurus gracilis*, which had appeared on a compost heap in the Eltham area. Mr. Willis commented that these were the largest specimens of the species he had seen; the "basket" part of the larger one being about five inches in diameter. Also exhibited was a collection of small animal bones found at Eden Park; these were passed on to the Mammal Survey Group for identification.

The President announced that Mr. Jim Baines would be retiring from the position of Secretary of the Natural History Medallion Committee at the end of the year and appealed for a nominee or volunteer to fill this position. Mr. Kelly also announced that Mr. D. McInnes had been appointed Sales Officer for the Club and Mr. B. Cullinan, Archivist. The Club already has a small quantity of historic records and old photographs and is interested in hearing from any one who may have items they are willing to donate, lend or have listed for future reference.

Botany Group — 14 June

Three members contributed to the programme at the June meeting of Botany Group. Mrs. M. Corrick spoke on "Some Victorian Bush-peas", illustrated with slides and pressed specimens; Mr. Tom Sault showed a few slides of some fungi which he had found on the Mornington Peninsula and then conducted a quiz on Eucalypts. Miss Gwen Piper talked about two "Projects in Botany", one on the succession of vegetation in

a gorge of the Mitchell River and the other a study of regeneration after fire.

The President, Mr. Ian Cameron, reported the death in April of Lord Talbot de Malahide, who had been responsible for the publication of "The Endemic Flora of Tasmania". Members expressed the hope that completion of the final volumes of the work would still be possible.

Arrangements were made for the June excursion to Simon's Gully near Arthur's Seat. It is anticipated that extension of quarrying in the area will have a considerable adverse effect on the vegetation of this gully which at present still contains ferns and is relatively unspoilt.

The speaker at the July meeting will be Mr. Rex Filson whose talk is entitled "A Botanical Meal in Japan".

New Members.

May —

Ordinary:

- Mr. Thomas J. Brodribb, 47 Frater St., East Kew, 3102.
- Mr. Lindsay Jolley, 5/7 Curtain St., Kingsbury, 3083.
- Mr. B. A. Joy, 329 Kooyong Rd., Elsternwick, 3185 (*Botany*).
- Mr. Kenneth Phillip Galloway, 72 Sth. Circular Rd., Tullamarine, 3043 (*Marsupials*).
- Miss Jennifer Skewes, 192 McIlwraith St., North Carlton, 3054.
- Mr. John E. Smith, 21 Frater St., East Kew, 3102.
- Miss Alice Turner, 172 Victoria Pde., East Melbourne, 3002 (*Birds' Botany*).

Joint:

- Dr. N. G. Elder, Mrs. A. Elder, James Elder, 39 Waldemar Rd., Heidelberg, 3084 (*Botany*).
- Rev. K. M. Pither, Mrs. K. M. Pither, 5 Westley Ave., Ivanhoe, 3079 (*Fauna and Flora*).
- Mr. Robert Thompson, Mrs. Edith Thompson, Flat 3, 5 Foote St., Elwood, 3184.

Country:

- Mr. John D. Berry, 468 Hargreaves St., Bendigo, 3550.

June —

Ordinary:

- Miss Penelope B. Morison, 476 Glenferrie Rd., Hawthorn, 3122
- Mr. Robert G. Stewart, 12 Piedmont St., Box Hill, 3128.
- Mr. Robert C. Ward, 2/26 Garton St., Nth. Carlton, 3054 (*Botany*).

Joint:

- Mr. James E. Pearson, Mrs. Lauris T. Pearson, 109 Kooyong Rd., Armadale, 3143.
- Mr. Peter A. Taylor, Mrs. P. Taylor, 36 Glendearg Grove, Malvern, 3144 (*Fungi*).

Country:

- Mr. James A. Gillians, Mrs. Patricia V. Gillians, R.S.D., New Dookie Road, Shepparton, 3630 (*Mycology*).
- Mr. L. D. Leavesley, 7 Lister Crescent, Shepparton, 3630 (*Flora*).



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Established 1880

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 13 August At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — "Birds of Bass Strait": Mr. Ken Simpson.

GROUP MEETINGS

(8 p.m. at National Herbarium unless otherwise stated)

Thursday, 9 August — Botany Group.

Wednesday, 15 August — Geology Group.

Thursday, 23 August — F.S.G. Meeting in Conference Room, National Museum of Victoria at 8 p.m. Some Aspects of Fern-gully Environment: T. Sault.

Wednesday, 5 September — Geology Group.

Monday, 3 September — Marine Biology and Entomology Group Meeting in Library Conference Room at National Museum at 8 p.m.

JUNIOR F.N.C. MEETINGS

Friday, 31 August — Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 7 Sept — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 7 Sept — Black Rock Juniors at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

Friday, 14 Sept — Montmorency and District in Scout Hall, Petrie Park at 8.00 p.m.

F.N.C.V. Excursions

Thursday, 16 August — Day Group. Alexandra Gardens and St. Paul's Cathedral. Meet 11.30 at S.E. corner of Prince's Bridge. Bring lunch.

Sunday, 19 August — Wattle excursion, probably in the Warrandyte area. The coach will leave Batman Avenue at 9.30 a.m. Fare \$2.00. Bring one meal.

Saturday, 25 August-Friday, 7 September — Warrumbungles, Canberra, etc. The coach will leave Melbourne from Flinders Street at 8 a.m. on Saturday, 25th August, stopping overnight at Finley, on to Parkes for Sunday night and arriving at Coonabarabran, Monday, where the party will remain until Sunday, with day trips to the Warrumbungles and surrounding areas. Sunday, 2 September, the party will commence the return journey, stopping overnight: Sunday, Wellington; Monday, Bathurst; Tuesday and Wednesday, Canberra; Thursday, Albury; reaching home on Friday. Accommodation is on a dinner, bed and breakfast basis and members will be responsible for their own lunches. It was necessary to divide the party in Coonabarabran, so the cost for the excursion will be \$155 with hotel accommodation there and \$170 for motel. The full amount should be paid to the excursion secretary by 31 July — all cheques being made out to Excursion Trust.

Wednesday, 26 December - Tuesday, 1 January — Port Campbell, details later.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

Vol. 90, No. 8

8 August, 1973

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A Tawny Frogmouth demonstrating the threat display of the species
Podargus. Photo: Heather Winsor.

The Search for Rudd's Rocks

by VICTOR JACOBS

THE FIRST HESITANT STEPS

The safari bus moved away from Wonga Hut, in Wyperfeld National Park, heading for Melbourne, with its load of forty Grade 6 boys and girls, leaving us rather pensive yet jubilant. We had not lost one; and even at this stage, felt that we had achieved some of our other objectives. Not the least of these was the imparting of a sense of wonder to them. Not a very difficult task in this wonderland. Still! One does not share a camp with forty lively youngsters without coming to know them well, missing them, and pondering the eventual effect of this park.

(Much later, reading a log book, we noted this comment. "The sight of cars and houses didn't bother me much as we passed through Yaapect and Rainbow, but when we reached the big cities I felt like throwing up.")

Sentimentality defeats action, and so we shouldered our packs having left the vehicle at the "No Vehicle" sign at the start of the Western Sector track and stepped out into a stiff west wind. My friend, Brigg Young, who had helped with the camp, volunteered to carry the heavy pack and admitting his many years of scouting as an indication of priority I accepted his offer. I, as usual, was festooned with binoculars, camera gear, and small satchel containing emergency rations, pathfinding gear, and first-aid materials.

We passed Sabrina with barely a glance; for our target was "Rudd's Rocks". These rocks were discovered and treasured by the late Rudd Campbell, and had long exerted a magnetic

pull on me. For those who have not been to Wyperfeld, we must comment that rock is extremely uncommon in the area. In fact one of the little assignments set for the pupils was to draw a five yard circle and hunt for various items, one of which was rock pieces. The nearest they came to success was at the base of the tower at Eastern Lookout, when some observant ones found a few bluestone screenings used for cement making. And so we hoped to find "Rudd's Rocks", that rare sandstone outcrop.

Once around both sharp bends of the Dogleg, the plain stretched away, and on the distant horizon small, hand-sized dumplings of clouds were well spaced. It was a matter of conjecture as to whether these approaching clouds contained rain or not. It was too muggy to be clad in nylon all the time, but it would certainly be too wet if one of these approaching "black galleons" sailed overhead. The first sailed well to the north; the next to the south, but close enough to warn us with some heavy drops. Apparently giving us a wide berth, the third tacked resourcefully to darken the sky and spill a wet load almost catching us ungarbed. With a final tail end swish it cleared us to give the sun and our own heat production the swift task of drying our trousers and lower limbs, the only wet parts of our bodies.

We were soon in "unexplored" country and came to the point A (Fig. 1), where the old bulldozed track veers off to the left at an angle of about 10°. Having found point A it appeared so easy now to find points

B, C, and D. B was the point where this same old track comes at right angles from the left to cross the new wide track and head north. C was the fainter track leading west from this north track leading to Hopping Mouse Hill, and D, "Rudd's Rocks". In imagination it was all very simple. In fact we never even found point B. We did find a few broad areas on either side of the wide track, but when they led nowhere, we had to admit that they were probably made by a back-ing grader. By dusk we estimated that we had overshot point B by at least a couple of miles; yet we did not believe this. It was a confusing situation. We could not have both missed the track, and also not reached it. We computed by scout know-how and watch, that we had walked at least eleven miles but felt that the effect of strong wind, tired legs and soft sand had upset our rough calculations. The inclement weather and our sustained pace had interfered with natural history observation, and the most unexpected bird had been a White-winged Triller which sat in a low shrub as we passed. By the time we had selected some mallees as a wind break for our "night" stop, there was still time to browse around. The pink shading of the ground was provided by *Baeckea crassifolia* and *B. ericaea*, with the latter more abundant; but the most interesting find was *Comesperma ericinum* (Heath Milk-wort) well out of its recorded territory. *C. calymega*, already recorded for Wyperfeld was not seen.

Before 7 p.m. we were asleep, and after some hours sleep I awoke. It was just midnight. Brigg grunted and I said, "Are you awake?"

"Yes!"

"Had enough sleep?"

"Yes."

"Shall we make a move?"

"Right!"

The track was soon located, and

even by starlight it was easy to follow it even to the extent of seeing faint old wheel tracks. We plodded on and regained the vehicle just on dawn. The last couple of hours had been illuminated by a waning moon, yet in spite of that extra light, features were flattened and it was a surprise to reach the Black Box and the car, for we had not even seen Sabrina.

We breakfasted back at Wonga Hut, then in an almost empty park I took advantage of Brigg and let him chauffuer me around the Car Trail while I rested the tele-lens on one or other of the open rear windows and took some kangaroo shots. By this time it was really time to head for the city . . . so we did.

HAVING HAD SOME ADVICE

August 1972

Wonga Hut had quite a smattering of teachers and their families. The motivation to come to Wyperfeld had been at least twofold. One factor was a notice in the Education Gazette from the Gould League of Victoria inviting teachers to Wyperfeld and offering to help to involve them in studies of the area; and the second factor; a footnote to the Survival Article — an offer to teachers by the author making himself available to those who also wanted to meet this national park and possibly lead primary school camps here.

Having plans for another walk out to the elusive "Rudd's Rocks" and still wearing city legs it was necessary to train a little, and some short walks were taken. Most of the tracks near to the camp area were suffering from an overdose of footprints, and cross country walking offered relief from the soft sand. A previous method of recording birds had resulted in a multiplicity of lists, and to simplify matters I decided to record the birds vertically as I first sighted them and also horizontally by

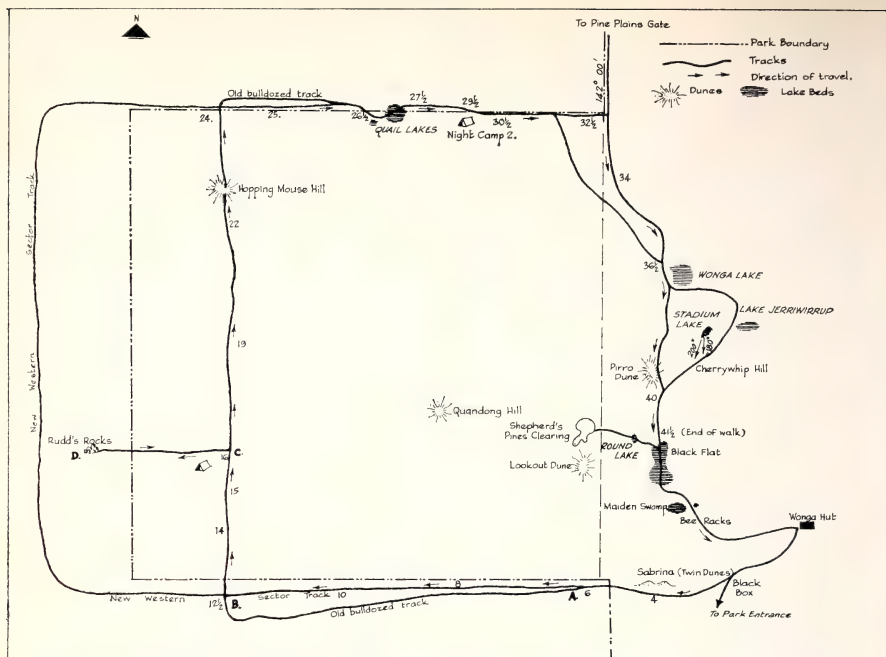


Figure 1.

a cross if they came up on later walks. (See Table 1.)

The description of the walks listed in Table 1 are as follows:—

- 20/8 From Wonga Hut to Mt. Mattingley and return.
- 21/8a Wonga Hut to Devil's Pools along the sandy track towards Lake Brambrook and return.
- 21/8b From Black Flat to Round Lake, and on to Calamifolia Valley (i.e. part of the ploughed poison trail to Shepherd's Pines Clearing) and return.
- 21/8c From the new Car Trail along Parker's Track and on to the south edge of the park.
- 22/8a Wonga Hut along Brambrook Track for about a mile, then due west past large living and dead Bulokes to the higher dune. Then due south over Mt. Mattingley to Wonga Hut.

Black Box at the start of the Western Sector Track to Sabrina Dunes and return.

- 23/8 As for 22/8a. On this early morning trip there was nearly a frost. Allan Thomson and I were escorting Susan McInnes, the artist who did the paintings for *Birds of Victoria 4*, published by the Gould League. She hoped to make acquaintance with some of our rarer friends as she prepared to paint for Volume 5 (*Dry Country*) to be published in 1973. She plodded along barefooted with blue toes and had beginner's luck, for apart from helping to discover the nests of the Tawny-crowned Honeyeater and the Shy Heath-wren, also shared in a sighting of a pair

of Mallee Emu-wrens. Here they were within a mile of Wonga Hut when my last sighting had been far away on the Ginap Track. It would be interesting to log the species that can be seen within a mile radius of Wonga Hut, and then show it to those who plain-tively ask the ranger where all the birds are.

27/8 The Black Box at the start of the Western Sector Track. Also the Tea Tree and the re-generating Scrub Pine to the south. It was a little joke to remark on the massive job the ranger had done in mulching the base of all those healthy ten-foot high trees with broken down Porcupine Grass.

For the observant readers who wonder what happened to days 24/8 to 26/8, I have to admit to going "walk-about" again. Those Red Rocks had haunted me, and I decided to have another try at finding them. Don Saunders had indicated that they should be seen from the south-west corner or a little to the north, so I anticipated walking the full length of that new track to find them.

During our lunch break on 22/8b in the cleft below Sabrina, Allan and I had heard a "different" bird call. The callers proved difficult to track down, and the ensuing glimpse so fleeting, that the call was presumed to come from an unlisted species as far as we were concerned. A return to the area was necessary. This suited my own plans for my trek was to begin along this section.

On the 24th I rose at 5.30 to see that Venus had preceded me. It was mild with no cloud and no one objected to being aroused. Thus quite a loaded vehicle deposited a half-dozen people at the end of the Black Box section and I had a wide range

of bearers for the first four miles. As we approached Sabrina, well before 9 a.m., some early feeding kangaroos vacated the track.

As soon as that "different" call was heard a battery of field glasses and cameras of all kinds came to bear and soon we had to admit that the White-fronted Honeyeater had a wider variety of notes than we knew.

With the problem solved, I left the others and stepped out west.

From this point details of the walk will be given as a mile by mile timed diary. The times were recorded by a fairly accurate watch and the distance by a somewhat less accurate pedometer. Thus details on the map are completely accurate.

In the diary the following details will be given.

Day of walk.

Time.

Distance walked that day.

Total distance walked.

Day 1. 9.30. End Mile 4. 4 miles.

Left group heading west.

9.35 a.m.—Very low (8') mallee.
Porcupine Grass.

9.40 a.m.—Dog's Leg Bend.

Day 1. 9.50. E.M.5. 5 miles.

Scattered Blue boronia. Flexile Hakea. Desert Banksia, Low domed *Casuarinas*. Erect Guinea Flower. Flame Heath. Two kangaroos in distance.

Day 1. 10.23. E.M.6. 6 miles.

Came to Old Bulldozed track leading off. Point A. Taller *Casuarinas* and abundant *Baeckea ericaea*.

Day 1. 10.47. E.M.7. 7 miles.

Two kangaroos well back and two quite near. *Baeckea ericaea* and *B. crassifolia* continue to tinge the area pink. Cypress Pines 2-4' tall. Two very large kangaroos near road.

TABLE 1

SPECIES

DATE AND ROUTE

	20/8	21/8a	21/8b	21/8c	22/8a	22/8b	23/8a	23/8b	27/8
Nankeen Kestrel			x	x			x	x	
Chestnut-tailed Thornbill			x		x			x	x
Golden Whistler			x			x			
Brown Falcon			x					x	
White-faced Chat			x				x		
Spiny-cheeked Honeyeater			x		x	x	x	x	x
Fantailed Cuckoo			x			x	x		
Little Thornbill				x	x		x	x	x
Brown Flycatcher				x			x	x	
Black-faced Cuckoo-shrike		x		x				x	x
Gilbert Whistler					x	x	x		
Silvereye					x				
Yellow-winged Honeyeater							x		
Straited Pardalote					x			x	x
White-fronted Honeyeater						x			
Weebill						x			x
Mulga Parrot						x			x
Brown Tree-creeper						x		x	x
Crested Bellbird						x			
Dark-tailed Thornbill						x			
Horsefield Bronze Cuckoo						x			
Pallid Cuckoo							x		
Mallee Emu Wren							x		
Black-eared Cuckoo								x	
Grey Fantail								x	
Pied Butcher-bird						x			
Red-capped Robin								x	x
Shy Heath-wren								x	
Crested Pigeon								x	x
White-tailed Warbler (Western)								x	

Day 1. 11.10. E.M.8. 8 miles.

Bigger mallee eucalypts on the ridges. Masses of *B. crassifolia*. Looking towards the right I recognise the group of small mallees where Briggs and I slept in 1971. (It really was *not* eleven miles).

Day 1. 11.40. E.M.9. 9 miles.

11.50 (9½ miles). Stopped for lunch. Left 12.23 p.m.

Day 1. 12.45. E.M.10. 10 miles.

More Desert Heath-myrtle in flower and a lot of Blue Boronia, past its prime, but with a few in good bloom. Some Shrubby Violet and Scarlet Mint-bush across the track.

Day 1. 1.10 p.m. E.M.11. 11 miles.

I was quite hot, so I chose a soft seat where the sand, banked up by the grader, makes an almost continuous bench and drowsed off. It was 2.20 when I awoke, and then moved off at 2.40.

Day 1. 3.00. E.M.12. 12 miles.

Many dead pines here with dwarfed Tea Tree and Desert Banksia.

3.15 — Cutting the wide main track at right angles and quite visible ran the old bulldozed track leading north towards Hopping Mouse Hill, and on to join the main east-west track farther north. It was as Gary Anderson had said it would be and clearer than we had expected to see it last year. It meant a change of plans again, for up there, somewhere, was a faint track to "Rudd's Rocks".

I turned right (Point B). All the parts of this old bulldozed track that I walked were easy to follow. The wheel tracks, though far from recent are definite. In between these tracks various plants have regenerated, but the difference in height between them and the odd ones in the actual tracks is quite enough to show up the more difficult areas for regeneration.

Day 1. 3.18. E.M.13.

Banksia, Boronia. Mat Heath-myrtle. Tea Tree.

Day 1. 3.42. E.M.14. 14 miles.

4.00 — Rested, and moved off at 4.10.

Day 1. 4.16. E.M.15. 15 miles.

A new species for me was later identified as Scaly Humea (*Humea pholidota*). Flame heath frequent. Mallees are very small. *Baeckea* was still abundant. There is so much *B. ericaea* here, and the plants so old, that it is quite likely that the species was established here for many years unnoticed, before Cliff Beauglehole recorded it. The sandy wheel tracks are quite soft, and kangaroo track overprints suggest that the marsupials have been grading it for many a year. The *B. crassifolia* in the soft sand were taller, and beside them grew a healthy *Grevillea pterosperma*.

Day 1. 4.43. E.M.16. 16 miles.

I had now come 3½ miles up the Hopping Mouse Hill Track, and half a mile later, having covered 16½ miles for the day, I stopped between two dunes to make a night camp. Unlike the wide new track that had been followed for the greater part of the day, where long level stretches are the rule and these flats separated by short, steep steps going up towards the west; the track I was now on was more undulating. Most of the dunes on it run east/west so that the traveller on the track undulates with it. This is not too inconvenient, for the rises, except for the summits are not over steep.

Night camp was a clump of medium sized mallees surrounded by Scrub Pine, Heart-leaf Beard Heath, Muntries and our two *Baeckea*s. It was still light enough to put the bed down and eat frugally but well. Drinking well was another matter, for some miles back an excessive dampness on my right thigh had indicated more than sweat. It was water, the water from my army water bottle. This army container in spite of its regulation cork was losing water. By capil-



Overgrown
track
heading
towards
Hopping
Mouse Hill.

Photo: Author.

lary action the water from inside was moving down through the felt cover on to my trouser legs. It it had not been spring I would have back-tracked immediately, but being cooler I transferred the remainder of the supply to a plastic bottle and worked out a ration.

Before the light had faded I re-wrote my hurried mile by mile diary, transferring it from the pocket notebook into a more sturdy book and entombing these more legible notes in my rucksack till the next long stop.

As a separate bird list based on the mile by mile notes is included I have not mentioned the birds in the on-the-track notes. This bird survey (Tab. 2) gives a rough clue to the bird distribution, while some apparently unexplained gaps may be understood by looking at the times of the observations. Most birds recessed during the warmer part of the day.

Scrub Robins, White-eared Honeyeaters, Red Wattle-birds, Spiny-cheeked Honeyeaters, White-browed Babblers, Cuckoos, Spotted Pardalotes, Ravens, Willy Wagtails, Crested Bellbirds and other birds with familiar calls were usually first noted by ear, with the exception of the Crested Bell-

bird, which is not difficult to note visually. Hawks and eagles were spotted moving in the sky. The Tawny-crowned Honeyeater so often heard, was usually first noted in the downward swoop of a hawking flight. The Purple-backed Wrens were, as you may note, seen quite a lot. In one party that included a fully plumaged adult as well as a number of demure females, there were a couple of immature males having no brown wings but sporting handsome blue moustachios. Any whistler that called was sure to lead me in its direction. I was learning to distinguish between the calls of the Gilbert Whistler and the Golden Whistler. I was still hoping to make a "first" with the Red-throated Whistler. The vociferous Smokers, the Regent Parrots, always warned of their approach as they swept across the low mallee, heading for the taller eucalypts. To bed. To sleep.

Day 2.

I had awoken at 6.30. I was warm, and remembering that I had last read my watch at 8.30 p.m. when some rain had fallen, was pleased to have been so cosy. Once out of bed I felt the nip in the air while the pink streamers in the sky heralded the sun.

TABLE 2

SPECIES NUMBER OF SPECIES AND LOCATION (MLS) OF SIGHTING

SPECIES	1-6	7-12	13-18½	19½-23½	24½-29½	30½-35½	36½-41½
Shy Heath-wren	1			1			
Tawny-crowned Honeyeater	4	2	2	3	2		1
White-fronted Honeyeater	2	1	3	2			1
Scrub Robin	1				2	1	
White-eared Honeyeater	2				1		3
Red Wattle-bird	1	2	2	1	1	2	2
Spiny-cheeked Honeyeater	2	1	1	1	1		2
White-browed Babbler	2				2		
Horsefield Bronze Cuckoo	1						1
Little Corella	1						
Spotted Pardalote		1			1	1	
Striated Field-wren				2			
Wedge-tailed Eagle	1	1					1
Purple-backed Wren		1	1 1♂ 4♀ 1 Im	1 1♂ 3♀ 1 Im			
Black-backed Magpie		1				2	1
Australian Raven		1	1	1	1	2	
Gilbert Whistler		1	2			1	
Nankeen Kestrel		1					
Regent Parrot		8	1			1	1
Willy Wagtail		1				1	1
Crested Bellbird			2	2		2	
Mallee Emu-wren				1♂ 1♀			
Weebill			1			1	
Grey Thrush			1		1	1	1
Brown-headed Honeyeater			1	1			
Purple-gaped Honeyeater			1		7		
Hawk?			1				
Emu			2				
Thornbill?				1			
Hooded Robin				1			
White-plumed Honeyeater					1		

NOTE: Hopping Mouse Hill occurs at approximately 22 miles.

TABLE 2—CONTINUED

	1-6	7-12	13-18½	19½-23½	24½-29½	30½-35½	36½-41½
Mulga Parrot					2	5	
Hawk?					1	4	3
Pink Cockatoo					12		
Yellow-tailed Thornbill					1		
Galah					1		
Brown Flycatcher					2		
Black-backed Wrens					1		
Grey Butcher-bird					1		
Mopoke						2	
Pallid Cuckoo						2	
Red-throated Whistler				1			
Kookaburra						1	
Pied Butcher-bird						2	
Dusky Wood-swallow						1	
White-browed Tree Creeper						1	
Red-backed Parrots						2	
Ringneck Parrots						4	1
Black-faced Cuckoo-shrike						1	2
Eastern Whiteface						1	
White-winged Choughs						1	

I had been protected from the rain by a thin sheet of polythene, and when I shook it vigorously, a myriad of tiny chips of ice flashed and sparkled in the early sun. I did a small "walk-about" of the area before breakfast, and when I returned to camp my desert boots had changed from brown to pink with the many petals of the Baeckas that had dropped from the plants on to my wet shoes.

7.20 a.m. — Moved on.

Day 2. 8.00 a.m. E.M.I. 17½ miles.

Two kangaroos on track. The male made haste to bound off but the female with grass in her mouth had a

couple more chews before leaving. Some active honeyeaters were quite different, and the group was large and static enough to provide the clues for later identification. They were Purple-gaped Honeyeaters but do not let the name lead you to expect to see that purple gape. I could not, and now identify them by the pale yellow below the dark band through the eye coupled with the bright yellow, plummy flash behind the ear. Just then, going up a rise, I made copious notes about a very pale pointed winged hawk, but was still bothered when I failed to identify it. Hawks often lead me

astray. Here Broom Ballart was frequent, and amidst the low mallee the Spiny Wattle was plentiful.

Day 2. 8.50. E.M.2. 18½ miles.

Day 2. 9.15. E.M.3. 19½ miles.

Off with the pack to take some shots of the track. Moved off 9.48.

Once again there was a stretched-out mass of *Baeckea*s, some *Banksia*s, plenty of *Flexile* Hakea and very low *Casuarinas*. No eucalypts here. I noticed my first *Phebalium* along the track but as yet only in bud. *Acacia rigens* was there too. No sign of the track to "Rudd's Rocks". I must have missed it.

Day 2. 10.20. E.M.4. 20½ miles.

Day 2. 10.30. E.M.4½. 21 miles.

I stopped here just east of a very large dune which I thought was Hopping Mouse Hill. Though the low stratus hinted at rain, the air was warm and dry, so I was able to leave my damp bedding spread out to dry as I climbed the dune. From the top there was a 360° view which included Quandong Hill to the east, but peer as I did, I was unable to locate Flagstaff Hill. Coming down the hill I made a positive sighting of a pair of Mallee Emu Wrens. I had not expected them this far west.

Day 2. 12.08. E.M.5. 21½ miles.

Moving across the eastern flank of an even larger dune I realised that I had been mistaken before, and that this was in fact Hopping Mouse Hill. The slopes were clad with *Leucopogon cordifolius*, *Lasiopetalum behrii*, *Phebalium glandulosum*, *Humea pholidota* and a different *acacia*. When the specimen was identified it was returned labelled *Acacia grayana*. That rare species will be mentioned later in this article. A powerful whistler-like call attracted my attention, but the shy caller made it difficult to see enough to be certain. When he finally came into full view, there was no

doubting that I had seen my first Red-throated Whistler.

Day 2. 12.40. E.M.6.

22½ miles.

Stopped 12.55 p.m. for lunch.

Day 2. 2.20. E.M.7.

23½ miles.

More Scaly Humea here with *Phebalium* and bigger mallee gums. The paucity of notes over these last few miles indicates fatigue and more energy being expended in moving legs and feet than eyes, ears and pencil. At 7¾ miles from the night stop and 24¼ miles from the start I met the main meridian track and turned right to travel east along a wider, clearer track.

There was a little mallee regeneration along this track, and from the middle of a large clump a couple of large kangaroos detached themselves and made off. To the north of the track *Westringia eremicola* was plentiful and in flower, while to the south the low domes of an acacia, probably *A. microcarpa*, were very abundant. The regeneration along the track varied from nil to very dense.

Day 2. 2.48 p.m. E.M.8. 24½ miles.

The eucalypt regeneration along the track lessened, but it was rarely possible to view a clear track to the next bend. The ranger's vehicle tracks, as infrequently made as they have been, wind in and out of the thick mallee clumps, but the dozers are needed to stop these impediments becoming total. *Acacia rigens* was abundant here.

Day 2. 3.10 p.m. E.M.9. 25½ miles.

I had a short spell till 3.35. Wal-lowa and Neallie both here. Also *Grevillea* and broombush.

Day 2. 4.01. E.M.10. 26½ miles.

More kangaroos, resting in the regenerating mallee, shot off and rounded a visible bend. Rounding a bend I came to a dense 12' high mass of regeneration almost blocking the way, and requiring a shoulder to get

through. Coming into the clear I saw the first of the Quail Lakes; a small one on the right of the track. The soil changed from red to grey and the lake was ringed with tall, dead, white mallee sticks 25' high. I stopped at 4.22 and left at 5.14. My notes show an avian activity in this area. The four Purple-gaped Honeyeaters were identified by the yellow streaks mentioned earlier.

Day 2. 5.16. *E.M.11. 27½ miles.*

Passing the end of the small lake I recorded a large area of Variable Groundsel and then a much larger Quail Lake on my left. Far from empty like the former, this one had a number of dead pines standing on its bed. Ten kangaroos vacated the area. Beyond the lake the track narrowed and was walled in by Moonah, Wallowa and Nealie. A less harmonic sound indicated Pink Cockatoos, and the call came from their nesting tree as if to say "Keep Away". There was something familiar about the tree. I feel positive that this was the one where many years before, Rudd had stopped his vehicle and thumped the bonnet metallically to induce those same cockatoos to leave the nesting site and raise their crests in a greeting. I was not on such intimate terms and having no bonnet to whack, stealthily approached aiming my medium sized lens. All I achieved was a retreating view of a pair of them.

Day 2. 5.50. *E.M.12. 28½ miles.*

A patch of Narrow-leaved Hopbush was illuminated by a pair of very large Golden Wattles blooming. These had a base plate of dried pods. Very large Grey Mulgas lined both sides of the track.

When I am in the wilderness I feel in harmony with it. While the needs for survival are present and I have my bearings, nothing at all seems hostile. Perhaps I am greedy of my solitude and not willing to share it

with the average human being. I am certainly sure that the activity of many of my fellow men encourages less love of them. So, when at 6.06 I heard shotgun blasts I felt far from eager to come across the shooters. They would not be too happy to be observed, whatever their target inside Wyperfeld. I hid within sight of the track hoping to sight the offending vehicle number. More shots reverberated and a vehicle could be heard bumping and jolting in the distance and circling around. Half an hour passed, and when it did not come into sight I moved well back from the track and bedded down. I drank sparsely as I was down to a pint of water. I slept soundly, at least till 11.00 p.m., when the bright moonlight shone on my eyelids. I next woke at 4.30 and drowsed till 5.00, when, wide awake, I breakfasted, packed up and moved off at 5.20 on Day 3. The mild night had continued and there was no dew.

Day 3. 5.40 a.m. *E.M.1. 29½ miles.*

A mopoke called. The road soon started to climb, and dark masses to the left of the track were checked and found to be Scrub Cypress Pine and Moonah. Sand was soft and deep.

Day 3. 6.02. *E.M.2. 30½ miles.*

A stretch of large mallee eucalypts. An early Pallid Cuckoo called into a sky lit with dawn's early streaks.

6.15 — I was following on the south side of an east-west fence; most likely the northern boundary. Here fresh car tracks indicated that the shooters were on the wrong side of the fence.

6.22 — Crossed Outlet Creek.

Day 3. 6.28. *E.M.3. 31½ miles.*

Day 3. 7.08. *E.M.4. 32½ miles.*

A little crucifer collected here later turned out to be, thanks to Cliff Beauglehole, *Harmsiodoxa blennodiodes* (syn *Blennodia blennodioides*), last collected in 1898 by Charles McLennan.

7.27 — Reached the "T" junction and turned south, heading down the "Freeway" on the last leg. Two kangaroos ahead moved into obscurity amidst tall pines.

Day 3. 7.40. E.M.5. 33½ miles.

A steepish dune lay ahead, and breasting the top I came to a very pretty sight. There, amidst very dense Porcupine Grass of various sizes, was a wide range of Cypress Pines all with their bases and roots well bedded down below the Porcupine Grass domes. I took a "five minute" break to ease myself between the prickly mounds to a camera vantage point.

Day 3. 8.08. E.M.6. 34½ miles.

Two big kangaroos occupied the binoculars and being busy, I only glimpsed an extremely thin parrot with a red beak and a yellow slash on its wing. The last mile had been a good one for birds. Back in the pines, a rich rollicking chorus was made by two black and white birds, more melodious than the Grey Butcher Bird, but in fact their Pied relatives. A rare kookaburra called his greeting, while two Dusky Wood-swallows perched in the pines. Amidst the bulokes a Tree-creeper paused long enough for me to see his white brow, and be certain that my Wyperfeld bird-list was one greater.

Day 3. 8.37. E.M.7. 35½ miles.

I rested in a section of Black Box till 8.55.

9.15 — I was well away from the creek line, and so out of the Black Box and into a dense growth of Tea Tree and Banksia wherein I noted two kangaroos and heard many Red Wattle-birds calling as they fed. They were using their "keeyu-keeyu-keeyu" call even more than the familiar "hochk-hochk".

Day 3. 9.20. E.M.8. 36½ miles.

The country was now similar to that north of Black Flat with sections of dunes followed by river flats.

9.28 — Off the dunes and down into Red Gum and Black Box. I was now at a lake bed with a dead Red Gum having on its trunk the largest boss that I have seen. My notes record this area as Lost Lake.

9.45 — I reached a pair of signs that read Pine Plains 8; Meridian Track. Lost Lake 3.

Day 3. 10.02. E.M.9. 37½ miles.

A bank of green moss amidst a grove of Black Box looked so inviting that I could not resist lounging awhile. Moved off 10.50.

10.58 — Signs of man. Footprints not my own. Probably made yesterday.

Day 3. 11.03. E.M.10. 38½ miles.

The clear blue sky seemed to shelter the earth, for there was no wind and the sun was warm.

Day 3. 11.25. E.M.11. 39½ miles.

I was hot and weary and with just a few mouthfuls of water left; I regretted my dependence on that useless army-type canteen.

11.55 — Reached the alternative route to Lake Wonga sign.

11.57 — Reached the alternative route to Black Flat sign.

Then I was ploughing up and down, interminably it seemed, through the worst of all deep sand on the tracks trod by visitors to the park. The River Red Gums at Black Flat were now in sight.

Day 3. 12.30. E.M.13. 41½ miles.

A couple of hundred yards past a flock of Red-backed Parrots, and I came to the station wagon owned by the group of people seen a few minutes before. They arrived and I begged a lift back to Wonga Hut.

The primary aim of the walk had not been achieved, although many secondary intentions had been fulfilled, and a few exciting bonuses had been gained — however "Rudd's Rocks" remained elusive.



Plate 2

Dead, River
Red Gum
at Lost
Lake.

Photo: Author.

ONCE MORE . . .

It was October 1972 and all the preparations for a second Junior Science Camp had been completed. The Grade Sixers, having been finally briefed were impatiently sitting out the weekend before the bus was to take them to Wyperfeld on the Monday.

I had left Upwey as soon as regulations permitted, and by using the Tullamarine Freeway had avoided many traffic lights, bottlenecks and stress driving. There was time for a lengthy tea break and a chinwag at Warracknabeal with a fellow teacher and a final sprint to arrive at Wonga Hut by a few minutes past midnight. Once the squeaking caravan jacks had ceased to disturb the peace, only the mopoke was sounding off, and the huge stars hung over an extensive peace. The reason for preceding the campers was to introduce a couple of newcomers to the routes we intended to walk and they, Ethel and Ted Breen, arrived about midday Saturday. They arrived amidst an assortment of vintage vehicles enjoying a car rally. All sorts of groups and organisations use Wiperfeld at the weekend, and not always with desirable results; certainly undesirable for the park itself

and for most of those who wish to see it preserved intact.

Before the children arrived on Monday the two "novices" had "fallen in love" with Wyperfeld albeit that their feet complained. On a walk to Sabrina, Ethel had sighted an orchid, which is now at the National Herbarium, being the second record for *Frasophyllum odoratum* for the area; a welcome confirmation of Cliff Beaglehole's find and an extension of the species from squares C and H on the Victorian Grid.

On the visit of 1971, when groups had walked to the big tree, they had varied the route back by first walking west to the oblong lake we called Stadium Lake; then walking more or less south along its long axis to climb the bank and locate a solitary cypress pine. We had then followed the ridge in the same direction finding some early flowering plants of *Calythrix tetragona* and a couple of *Phebaliums* in flower. Sighting the top of Pirro Dune we had scaled it for the view and headed down to meet the deep sand of the track just north of Black Flat.

This had been on a coolish day, and anticipating warmer weather for

the second school camp, but still wishing to vary the route, I had tried a new route in 1972. Using the same solitary cypress pine and taking a bearing of 180°, I met the track too soon on the opposite side of outlet creek not far south of the turn-off to the big tree.

While putting Ethel and Ted through their novice course we had used the same pine again, but this time changed the bearing to 200°. This route proved interesting, cutting through some lake beds, climbing some good dunes and leading us right to the track at Cherry Whip Hill. This compass walk was used during the second camp with groups of pupils and the same objective was gained.

The camp came and went successfully, and by the following Saturday morning there remained only the rangers, my daughter, Simone, myself, and Cliff Beaglehole, who had turned up the night before.

My specimens collected in 1972 had been lodged with Gary Anderson and he located them for Cliff to peruse. Cliff was interested in a couple of the specimens but did not become really excited till *Acacia grayana* was produced. I was aware that in the Distribution of Victorian Plants, *A. grayana* was recorded only in Grid C and that the specimen before Cliff was found well inside the park. Knowing the multiplicity of his new records for Wyperfeld and also that many of my apparent "firsts" had become interesting seconds I was not very surprised to find that *Acacia grayana* was not listed in Grid B and had left the matter there. Apparently I made an error. *Acacia grayana* was found as a single plant by Alf Gray in the Little Desert, and is a hybrid of *Acacia brachybotrya* and *A. calami-folia*, being intermediate between the two. Alf Gray's find had been described by Jim Willis, but the type

specimen had died and even the collected seeds had failed to produce. To my present knowledge the only existing plant of the hybrid was somewhere in Wyperfeld. Its exact location was in a diary at home and memory told me it was somewhere between mile 7 and mile 10 on Day 2 of the walk. Cliff had to see this and the *Harmsiodoxa*, too. Rabbits had disposed of the cress and my faulty memory caused us to search the wrong area for the *acacia*. Cliff proved capable of determining a vast number of plants from the land rover at 15 m.p.h., but when the driver exceeded that speed we went on foot. We did not find it. My notes have given me more clues, therefore some time I must walk out and give my *new* water container a trial!

While on foot in one section, we came across a plastic marker containing a note left last September. It was blurred but readable and indicated my night stop at the end of Day 1. On the summit of the very next dune going north towards Hopping Mouse Hill was a very faint overgrown track leading west.

While tramping about and festooning my desert boots with *Baeckea* petals that cool morning, I had not been observant enough to see what I had probably walked over twice — the track to "Rudd's Rocks".

After a quarter of a mile along this track we came to the remains of a lowan mound that had been in use before the big fires had wiped out all the Mallee Fowl in the Western Sector. At 1½ miles the broombush plain spread out in all directions with here and there a few stands of medium sized mallees. This broombush was never five feet high and often less than two. At two miles a few small red rocks lay at the edge of the indistinct track, and standing up after examining them I noticed



Rudd's
Rocks.

Photo: Author.

one of the party standing apparently ten feet tall, although his feet were invisible in the small broom bush. Were they there. Another fifty paces and they were at our feet.

It had been a long search with many direct misses and some lucky finds; but to stand pensively looking at that rare formation made it all worthwhile. Since then Ian Moroshki has discovered more red outcroppings while doing a compass walk, but this

group because of their connection with Rudd Campbell will remain shrine-like in my memory. Remote as they are at present, one feels that the accelerating pace of regress may cause their real distance to diminish to a degree that drags them into the maw of destruction. When one stands beside them looking west towards the unseen South Australian border one wishes that farsighted government would proclaim as part of Wyperfeld



... looking
west towards
the South
Australian
border ...
Photo: Author.

all that untouched Victorian wilderness and create a very real buffer against those destructive forces.

Very little time remained before duty called, but a walk with Cliff up a steep ridge overlooking an extensive valley to the west of Mount Mattingley did allow us to "overlook" a fluffy white Wedge-tailed eaglet in its nest. The parents fled with our first shadow but the young bird was easily seen with binoculars as it stretched,

moved around the edge of the nest and opened its wings fully. On this ridge which had been burnt the previous year Cliff and I each found a further Scented Leek-orchid.

A last word of warning — I intend to go out there again, and I feel sure that many of my readers will want to see what there is to be seen. Do not go without thorough preparation, and that includes putting the ranger into your picture.

The Origin of Generic Names of the Victorian Flora

Part 1 — The Person behind the Name

[continued from 90 (7)]

by JAMES A. BAINES

Imperata. Named by Cyrillo after Ferrante Imperato (1550-1625), an apothecary of Naples.

Kennedia. Named by Ventenat (who used this spelling, not the -ya form used for so long) after John Kennedy (1775-1842), an original partner of Lee and Kennedy, nurserymen, of Hammersmith. (The year of birth is that of Smith and Stearn, but Britten and Boulger in "British and Irish Botanists" gives the date of birth as 30 Oct. 1759). Kennedy was the author of *Page's Prodromus* (1817).

***Kickxia.** After Jean Kickx (1775-1831), a Brussels apothecary who wrote on cryptogamic plants. (Black states that he was a Belgian professor.)

Kochia. Named by Roth after Wilhelm Daniel Josef Koch (1771-1849), professor of botany at the University of Erlangen, Germany (Koch means cook.)

***Koeleria.** Named by Persoon after G. L. Koeler, a German botanist.

Korthalsella. Named by Van Tieghem after Peter Willem Korthals

(1807-1892), a Dutch botanist who spent the years 1831-1836 in Java, Sumatra and Borneo. (Korthals in Dutch means short neck — a descriptive surname.)

Kunzea. Named by Reichenbach after Gustav Kunze (1793-1851), professor of botany at Leipzig, who wrote mainly on the ferns. He was also a physician with a good knowledge of entomology.

***Lamarckia.** After Chevalier Jean-Baptiste de Monet Lamarck (1744-1829), French naturalist, author of *Flore Francaise*; a Darwin precursor. Royal botanist; custodian of herbarium of Jardin du Roi; wrote *Dictionnaire de Botanique*.

Lavatera. Named by L. after a 16th Century physician and naturalist, J. R. Lavater. (It was one of Tournefort's pre-Linnean names adopted by L.)

Lawrencia. Named by Hooker after Robert William Lawrence (1807-1833), who collected in the Western Mountains in Tasmania. (Long included in the genus *Plagianthus*.)

Laxmannia. Named by R. Brown after Erich Laxmann, professor of botany at St. Petersburg, but himself a Swede, born at Abo (now Turku in Finland) in 1730, died at Tobolsk in Siberia, in 1796; author of 'Letter About Siberia', 1967. Three other genera were named Laxmannia, in Rosaceae, Rubiaceae, and Compositae, all invalid, and even Brown's genus in Liliaceae had to be conserved.

Leichhardtia. Named by R. Brown in 1849 after Ludwig Leichhardt (1813-1848) when the disappearance of the controversial German explorer was fresh in the public mind. Austral Doubah was known as *Marsdenia australis* from 1917, but Brown's name, *L. australis*, has been restored. (Mueller's *Leichhardtia* is now *Phyllanthus*, and Shepherd's is *Callitris*.)

Lepedeza. Named by Michaux after Vincente Manuel de Céspedes, Spanish governor of Florida about 1790. The de Céspedes family were prominent for centuries, in Spain and Cuba. Michaux oddly substituted L for C initially.

Levenhookia. Named by R. Brown after Anton van Leeuwenhoek (1632-1723), the Dutch naturalist whose discoveries with simple microscopes covered a very wide field. In botany he described monocotyledonous and dicotyledonous stems. Brown simplified the spelling of his surname when naming the genus.

***Leycesteria.** After William Leycester (1775-1831), Chief Justice of Bengal about 1820. Burkill in his *Chapters on the History of Botany in India* states that when botanist-surgeon Nathaniel Wallich, in charge of Calcutta botanic garden, left India for Penang he suggested that Judge William Leycester should act for him. It was Wallich who named the Himalayan Honeysuckle *Leycesteria* in 1824. The F.N.C.V. excursionists saw *L. formosa* growing in New Zealand,

where it is known as Spiderwort (according to Willis).

Lhotzkya. Named by Schauer after Jan Lhotsky, born in Poland of Czech parentage. His name also appears as Johann Lhotzky, a German form of the name, hence the spelling used by Schauer, and Chisholm in *The Australian Encyclopaedia* uses the English form, John Lhotsky, by which he was known during the five years he spent in Australia in the 1830's. He was a doctor of medicine and a Fellow of the Royal Botanical Society of Bavaria. He wrote on his travels in New South Wales for the Linnean Society of London, also a book that included the first printed descriptions of the Canberra area, prepared the first arrangement of an Aboriginal song, and collected plants in Tasmania to form the nucleus of a herbarium there. (Now *Calytrix*.)

Libertia. Named by Sprengel after Marie A. Libert (1782-1863), a Belgian botanist who wrote on liverworts.

Lindsaya. After John Lindsay (fl. 1785-1803), a surgeon in Jamaica who corresponded with Sir Joseph Banks. He wrote on ferns and *Mimosa*. Named by Dryander, the genus has also been spelt *Lindsaea*.

Lippia. Named by L. after Augustin Lippi (1678-1701), an Italian naturalist and botanist who was killed in Abyssinia. (Now *Phyla nodiflora*.)

Livistona. Named by R. Brown after Patrick Murray, Baron of Livingston, who before 1680 had a good garden that became the Edinburgh Botanic Garden; this is stated by Smith and Stearn, but Livingston is not mentioned in the chapter on Edinburgh's Royal Botanic Garden in *Great Botanical Gardens of the World*, by Hyams and MacQuitty.

Lobelia. Named by L. after Mathias de l'Obel (1538-1616), a Flemish botanist who was physician to King James I of England. (Also spelt de

Lobel.)

Logania. Named by R. Brown after James Logan (1674-1751), an Irish-born scientist who became William Penn's agent in North America and governor of Pennsylvania. He wrote a book in Latin on the sexuality of plants, published at Leyden in 1739. He went with Penn to America in 1699, and became governor in 1736.

Loudonia. Named by Lindley after John Claudius Loudon (1783-1843), a landscape gardener and botanical author. He travelled in northern Europe and in Italy, edited "*Loudon's Gardener's Magazine*" 1826-43, wrote *Encyclopaedia of Plants* and *Arboretum Britannicum* (on British trees).

Ludwigia. Named by L. after Christian G. Ludwig (1709-1773), a Leipzig professor.

Luzuriaga. Named by Ruiz-Lopez and Pavón after Ignatia Maria Ruiz de Luzuriaga, professor of medicine and botany, who was probably a relative of Ruiz.

Lyonsia. Named by R. Brown after Israel Lyons (1739-1775), astronomer, who taught Banks botany, and went on an Arctic expedition in 1773. (*Lyonsia straminea* is now *Parsonsia brownii*.)

Marsdenia. Named by R. Brown after William Marsden (1754-1836), secretary to the Admiralty, orientalist and traveller, author of *History of Sumatra* (1783). Irish-born, he was elected F.R.S. in 1783.

Marsilea. Named by L. after Count Luigi Ferdinando Marsigli (1656-1730), an Italian botanist of Bologna. His surname means "from Marseilles". As well as being a naturalist, he was a geographer and soldier. He founded the Institute of Science and Arts at Bologna in 1714, and was a pioneer in the field of oceanography. As a historian he wrote *The Military State of the Ottoman Empire*.

Martynia. Named by L. after John Martyn (1699-1768), London physician and professor of Botany at Cambridge, in which post his son, Thomas, succeeded him. He founded the Botanical Society of London in 1721. (*M. louisianica*, Purple-flower Devil's-claw, is now *Proboscidea louisianica*.)

***Matthiola.** Named by R. Brown after Pierandrea Mattioli (1500-1577), an Italian physician and botanist, author of a commentary on ancient Greek botanist Dioscorides, which exists in Latin, Italian, German, French and Czech versions.

Menkea. Named by Lehmann in 1843 after Dr. Carl Theodor Menke, of Pymont, Prussia.

Millotia. Named by Cassini in 1829 after a French scientist called Millot, author of a pharmaceutical history of camphor (Strassburg 1837).

***Minuartia.** After Juan Minuart (1693-1768), of Barcelona.

Mirbelia. Named by Smith after C. F. Brisseau de Mirbel (1776-1854), one of the founders of cytology and plant physiology. First in charge of the Jardins de la Malmaison, then secretary-general of the ministries of Police and Interior, he became a professor at the Museum and the faculty of Sciences of Paris. In 1835 appeared his remarkable monograph on the anatomy of *Marchantia polymorpha*. The beginnings of palynology may be noted in his *Elements of Vegetal Physiology and of Botany*, 1815.

***Moenchia.** Named by Ehrhart after Konrad Moench (1744-1805), German botanist, a professor at the University of Marburg.

Montia. Named by L. after Giuseppe Monti (1682-1760), professor of botany at the University of Bologna, Italy.

(to be continued)

Nature Notes from the Gold Coast

by

ALEX. N. BURNS

The advent of cooler weather generally, especially at night, has created an easing off of activity in the entomological field, more so as heavy rains (10 inches in three days) and high winds have persisted for almost a week. Occasional short bursts of sunshine have an almost immediate effect in arousing activity with most of the living creatures. Five minutes of this increased warmth brings quite a number of butterflies to flowers in search of nectar. Most common amongst these are the Eastern Brown Crow (*Euploea tulliolus tulliolus* Fab.), the Common Crow (*Euploea core corinna* MacL.) the Blue Tiger (*Danaus hamata hamata* MacL.) and several species of small Blues (Fam. Lycaenidae) and Skippers (Fam. Hesperidae).

Most noteworthy amongst the "winter" butterflies has been the White Nymph (*Mynes geoffroyi guerini* Wall.) which ranges from Cape York southwards to Byron Bay (N.S.W.) and is generally regarded as being rare in the southern limits of its range. Quite a number of specimens have been observed in the garden and Burleigh National Park throughout the month of June. This led to a search of feeding trees which are the small leaved Stinging Tree (*Laportea* sp.) in the hope of finding eggs. Very soon a female butterfly was found depositing eggs on the underside of a leaf not six feet from the ground. A batch of 25 eggs was laid and these were carefully removed to a breeding cage, and in 24 days the young larvae hatched. As the original leaf had withered slightly the portion with the eggs was attached to a fresh leaf. The young larvae

which are gregarious, arranged themselves more or less in a circle on the underside of a leaf. After a few days the feeding trees were again visited in the hope of finding more eggs, but better still another larger batch of young larvae was found also about six feet from the ground and on the underside of a leaf. Other batches were noted higher up on the trees. These larvae are voracious feeders and grow rapidly, still remaining gregarious. This habit persists throughout the larval life, but when ready for pupation they wander off singly or several together in search of sheltered places where they can pupate. The larvae are typical "Nymphalid" having their bodies ornamented with branching spines. They are brownish in colour, and the pupae are brown and spiny and are attached by the tail hook or "cremaster" to a small pad of silk from which they hang head downwards. In appearance the White Nymph is quite unlike the usual "nymphalid", in flight and appearance it resembles the Common Jezabel (*Delias nigrina* Fab.) of the Family Pieridae, but its structure and life history at once places it in the Family Nymphalidae.

In the plant nursery at the Currumbin Bird Sanctuary, a large number of young Papaya (papaw) seedlings is being raised, and when from 6 to 12 inches in height, leaves and tops were being eaten. Caterpillars or grasshoppers were at once suspected and spraying with insecticide was resorted to, completely without effect. One mild day, quite by accident, the culprit was caught "red-handed" and

proved to be none other than a Frill-necked Lizard about 20 inches in length. Quiet observation revealed that he was merely satisfying his appetite in no small manner. Accordingly he was removed to another part of the estate a long distance from the nursery. To date he has not returned.

The cooler weather has brought black Aphis to the terminal shoots and leaves of the Hibiscus bushes, and these are now being visited by numbers of Silver Eyes (*Zosterops* sp.) which are doing a great job cleaning up these pests. Occasionally sparrows have been observed picking aphids from various plants in the garden. At

the present time the beautiful apricot flowered *Browallia* bushes are in full flower in Gold Coast gardens; these are a great attraction to Honeyeaters and at least three species have been observed.

Next month will bring increased activity to the birds and insects: already with the lengthening of the days the scrub turkeys and other inhabitants of the National Park are becoming increasingly active. Several koalas have been in the white barked Eucalypts throughout the past month along the road bordering the park. Usually in the colder weather they move to the trees on the top of the hill; not so this season.

SWAN BAY, QUEENSLIFF

A proposal by a development firm to construct a marina on the former shell-grit works near Queenscliff is causing concern.

The main source of worry is that it will be necessary to dredge a channel across the southern end of Swan Bay to provide access to the marina — and this in turn may adversely affect the total area of Swan Bay as far north as Duck Island and Edwards Point.

The Geelong Field Naturalists' Club and the Geelong Environmental Council are working on the project, and additional support may be sought.

Meanwhile **Urgent Information** is needed — all bird notes, references and similar data about Swan Bay must be compiled if we are to ensure that there is no damage done to its fauna.

There appears to be an ornithological link between Swan Bay and Mud Islands, and if this can be proven, the immense value of Swan Bay becomes obvious.

Data should be sent to the G.F.N.C., care of:

Trevor Pescott,

4 Victoria Terrace, Belmont, 3216.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

reptiles of victoria - 9

by HANS BESTE

Plate 17

Leiopisma trilineatum — Three Lined Skink.

A slender, fast moving lizard.

Length: to 7 inches.

Movable eyelids. Distinct ear-opening. Legs well developed. Tail long, tapering to a point. Head spade shaped. Upper dark brown. A black line along the spine. Also dark dorso lateral stripes, edged with fine cream coloured lines. Under greyish-white. A salmon coloured throat is often conspicuous in this species.

Habitat: in open as well as timbered country, among debris, under rocks and logs.

Best distinguishing features — movable eyelid, stripes and salmon coloured throat.

Plate 18

Lerista bougainvillii — Bougainville's Skink.

A feeble limbed skink, rarely found in the open.

Length: to 5½ inches.

Head narrow, not distinct from neck. Ear-opening small. Five fingers and five toes. Legs weakly developed. Basic colour pale salmon-pink. Upper light grey. Chocolate-brown dorso lateral stripe, from snout to just past hind legs. Tail long, tapering, pale orange, speckled with small brown spots. Under pale salmon to white.

Habitat: under rocks and logs, mainly in sandy areas, where it hunts for its prey underground.

Best distinguishing features — weak limbs, number of toes, markings.



Plate 17



Plate 18

Field Naturalists Club of Victoria

General Meeting

9 July

In spite of a foggy evening the hall was well filled with members and visitors who came to hear the review of the Club's excursion to New Zealand in January this year. Mr. Jim Baines outlined the route of the trip and referred to the fuller account published in the June and July *Naturalist*. He thanked Mrs. Joan Monahan of Auckland for these articles and also expressed appreciation of her help in acting as guide on the trip. Mr. Baines also referred to the help received from the rangers of the various National Parks which the party visited. Mr. Dick Morrison followed with a collection of his slides taken on the trip giving impressions of the spectacular scenery as well as details of some of the interesting plants, insects and birds.

A full list of correspondence was on the notice board as well as Council minutes and a large collection of press cuttings dealing with matters of interest to the Club. A copy of the M. & M.B.W. Environment Study of Port Phillip Bay was tabled and also the minutes of a round-table conference on the management of alpine areas held on 22 May and arranged by the Premier's Department.

Mr. Tom Sault spoke on the work of Miss Rosemary Myers, a school girl member of the Geology Group, who had objected to the proposals for quarrying in the vicinity of Werribee Gorge. Mr. Sault said she had put a great deal of time and study into preparing reports and maps of the area and corresponding with Ministers and Government Departments. It appeared that her protests had at least delayed the start of quarrying and it is hoped that the area may eventually become part of a National Park.

Members were pleased to see Miss Jean Galbraith at the meeting and also to receive a message of greeting, through Mrs. Salau, from a former Club secretary, Mr. F. S. Colliver, who had been on holiday in Melbourne.

Among the exhibits at the meeting was a large collection of books and pamphlets about New Zealand, displayed by Mr. Jim Baines; Mr. Garnet showed a specimen of Rock Fern of the genus *Cheilanthes* which he had originally grown from spores collected at Mt. Olga in 1960. Under the microscopes were some samples of pond life collected by Haw-

thorn Junior Naturalists' Club at Albert Park Lake and Alexandra Gardens. Included were crustaceans of the sub-classes Copepoda and Ostracoda, and the alga *Volvox*.

Botany Group

12 July

The speaker at the July meeting of Botany Group was Mr. Rex Filson, who spoke about his visit to Japan whilst abroad on a Churchill Scholarship. As well as talking and showing slides of Japanese city life and of country trips to collect lichens, Mr. Filson gave a detailed description of a 'Botanical Meal' which had been specially prepared at the home of Dr. Kurakawa. Many of the dishes were based on fruits, vegetables and even flowers very strange to the Western palate. Included were such things as sea-weed soup; *Chrysanthemum* and *Ginger* flowers cooked in batter; the seeds of *Ginkgo biloba*, the finely sliced roots of a water lily, as well as pickled cucumbers, grated pickled radish, sliced carrots, mushrooms and eggplant each served as an individual dish in various sauces and accompanied by rice. The meal occupied most of the evening and Mr. Filson commented that he had felt it an unusual honour to be asked into a Japanese home.

Correspondence received included a request from the Diamond Valley Conservation Society for help with a survey of vegetation in the shire. Arrangements were made for some members of the Group to assist.

The 'Flower of the Night' was *Stenocarpus sinuatus*, the Firewheel Tree. A very fine spray of flower, donated by Maranoa Gardens, was on display and also the flowers of several other representatives of the family *Proteaceae*.

A brief report and plant list from the June excursion to Simon's Gully was received and arrangements were made for the July excursion to Ocean Grove.

The next meeting will be on 9 August when various members will contribute to the subject "Wattles". Members of the Group and others may be interested to keep the evening of 11 October free, when our meeting will be addressed by Messrs. Kriek and O'Shaughnessy of the Board of Works who will speak on "Studies and Experiments in the Management of Water Catchment Areas".

Day Group

19 July

Braving the bitterly cold weather 11 members met at the Sports Pavilion in Como Park, South Yarra. The group meeting was held and lunches were eaten in the central room of the pavilion. The wide windows overlooked the site of a billabong on the Yarra which was later to become Lake Como and still later the beautifully set sports oval of Como Park.

The group next moved to Como House which has been kept by the National Trust as a fine example of gracious living in the Victorian Era. The present gardens are all that remain of the original Como Estate of 54½ acres. Among the many exotics were some tall *Arancarias* and a magnificent specimen of *Moreton Bay Fig*. We learnt that much of the original

planting was done under the direction of Baron von Mueller.

Field Survey Group

June:

The subject for the evening was "The Effect of Fires on Forests and Their Inhabitants". The talk was by Mr. B. Dexter and Mr. A. Heislars of the Forests Commission, and was preceded by two interesting films from America and Australia dealing with the effects of fire, shown by the Commission's projectionist. Mr. Dexter and Mr. Heislars then discussed different aspects of regeneration and fire ecology. Of particular interest to the twenty-three members and friends present was a discussion on the effects of fire on small forest animals such as *Antechinus*. Questions to the speakers then took up the remainder of the evening.

FNCV New Zealand Excursion Report

Unfortunately, the writer of the comprehensive report of this excursion [*Victorian Naturalist* 90 (6), (7)] was inadvertently left un-named. It was in fact Mrs. Joan Monahan, whom we thank sincerely.

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Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 10 September — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — "The Evolution of Marsupials": Mr. Pat Curlis.

New Members — July:

Ordinary:

Mr. Daryl R. Cooper, 4 Illawarra Ave., Rowville, 3178 (*Botany*).

Mrs. G. Isaac, 5 Vista Ave., Kew, 3101 (*Botany*).

Miss Jocelyn E. Lade, 511 St. Kilda Rd., Melbourne, 3004 (*Botany, Mammals*).

Mr. W. M. Molyneux, Belfast Rd., Montrose, 3765 (*Botany*).

Joint:

Mr. B. A. and Mrs. R. J. Abbott, 21 Graves St., Essendon, 3040.

Country:

Miss Lyn J. White, c/o Narellan House, Reid, A.C.T., 2601.

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Thursday, 28 September — F.S.G. General Meeting at 8 p.m. in Conference Room, National Museum, Victoria. Speaker: Mr. P. Kelly — Cryptozoic beetles.

Friday, 14 September — F.S.G. Film Night — to raise funds for Night Survey Equipment. Supper, donation 50c.

Wednesday, 19 September — Microscopical Group.

Monday, 1 October — Marine Biology and Entomology Group Meeting at the Library Conference Room at the National Museum at 8 p.m.

Wednesday, 3 October — Geology Group.

Thursday, 4 October — M.S.G. Meeting at 8 p.m. in Arthur Rylah Research Institute, 123 Brown Street, Heidelberg.

JUNIOR F.N.C. MEETINGS

Friday, 28 September — Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 5 Oct. — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 5 Oct. — Black Rock Juniors at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

Friday, 12 Oct. — Montmorency and District in Scout Hall, Petrie Park at 8.00 p.m.

F.N.C.V. Excursions

Thursday, 13 September — Botany Group: "Some Plant Associations on the Mornington Peninsula", by Mr. Tom Sault.

Sunday, 16 September — Mt. Beckworth. Leader, Mrs. S. Bedggood, and members of the Ballarat F.N.C. The coach will leave Batman Avenue at 9.30 a.m. — fare \$3.00. Bring two meals. The meeting place in Ballarat is in Albert Street, near the Comfort Station, at approximately 11.30 a.m.

Thursday, 20 September — Day Group — To Mrs. R. G. Taylor's garden and Austraflora Nursery. 10.12 Lilydale train to Croydon, then 11.01 Mt. Dandenong bus to corner Mt. Dandenong Tourist Road and Sheffield Road North, Montrose. Cars meet at this corner at 11.20. Bring lunch.

Sunday, 30 September — Botany Group Excursion to Blackwood and vicinity — transport by private car.

Wednesday, 26 December-Tuesday, 1 January — Port Campbell with day trips to surrounding areas. Motel accommodation has been booked at \$11.00 per day for dinner, bed and breakfast; coach fare, \$24.00. Further details later. The excursion secretary would be glad to hear from local members and would welcome any suggestions for the day trips.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

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5 September, 1973

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Front Cover:

The photograph of the female *Antechinus swainsonii* was taken by Liegh Winsor of the Field Survey Group, at the Aire Valley Plantation, Beech Forest, in the Otway Ranges, Victoria.

Conservation Problems at Black Rock Point

by E. C. F. BIRD, P. W. CULLEN, AND

N. J. ROSENGREN*

The coastline between Brighton and Beaumaris (Fig. 1) is dominated by cliffs and bluffs, with sandy beaches and rocky platforms on the foreshore. Rocks which outcrop in the cliffs and shore platforms are of Miocene to Lower Pliocene age, and consist of poorly cemented sands, grits and clays resting upon harder reddish-brown ferruginous sandstones. Kenley (1967) classified these as two distinct formations, the Red Bluff Sands resting upon the more indurated Black Rock Sandstone, both gently folded in a series of parallel anticlines and synclines with axes trending N.W. to S.E., and thus intersecting the coastline.

Promontories such as Picnic Point and Red Bluff occur where anticlines bring up the more resistant Black Rock Sandstone to outcrop above sea level at the base of the cliff and in shore platforms. The intervening embayments (such as Half Moon Bay, to the south of Red Bluff) occur where synclines bring the softer Red Bluff Sands down to and below sea level, where they have been scoured away by marine erosion (Bird 1971). Black Rock Point (Fig. 1) is a slight promontory where the axis of the Black Rock anticline crosses the shore (see Plate 2 in Kenley 1967).

At the end of last century the coastline between Brighton and Beaumaris showed extensive natural cliffs which were receding, in some sectors rapidly, as the result of erosion. Early attempts to stop this erosion included the timber wall built at Picnic Point around 1900, and similar structures on Green Point in 1905. Subsequently, stone and concrete walls were added

at these sites, and also along the southern shores of Half Moon Bay, where the antique warship *Cerberus* was grounded offshore to form a breakwater in 1926. In 1936 the Foreshore Erosion Board mapped these artificial structures in the course of a survey of the coastline between Brighton and Mordialloc to assess the need for further shore protection works.

This survey recommended building undercliff walls on all sectors where cliff recession was judged to be proceeding rapidly, and within the next ten years walls were added at Brighton Beach, at Sandringham, from Black Rock to Quiet Corner, and in sectors between Mentone and Mordialloc. The usual procedure was to build a wall at the back of the beach, with a paved undercliff footpath, and to cut the vertical cliffs back to a more gradual slope, which was stabilised by planting with vegetation. In some sectors — at Hampton, for example, and at Quiet Corner — this kind of treatment was unavoidable, for Beach Road had been built close to the coastline, and continued erosion would soon have undermined it.

Since 1946, the walled sectors have been extended laterally, so that now there are artificial structures along almost all of the coastline north from Picnic Point, as well as on several sectors between Picnic Point and Rickett's Point. Because vertical stone or concrete walls were found to

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cause wave reflection, leading to the scouring away of beaches, foreshore engineers have more recently preferred to dump large boulders at the back of the shore, knowing that these will absorb more of the energy of storm waves, and hoping that beach erosion will be less severe in front of them. In the last few years, many people have begun to question the need to extend coast walls and dump unsightly heaps of boulders on the shore. Natural cliffs persist only at Red Bluff, Black Rock Point, and between Table Rock Point and Mentone, and it has been argued that these should be preserved as scenic features to keep an element of diversity on a coastline that has been made more uniform, and thus less interesting, as the result of twentieth century—engineering works.

The cliffs at Black Rock Point (Plate 1) stand between 80 and 100 metres seaward of Beach Road, and so there was no immediate threat of undermining by cliff recession. However, in August 1970, Sandringham City Council began dumping concrete slabs and rubble on the shore south of the car park at Black Rock Point, and it was realised that this could be the prelude to a further phase of “reclamation”, the eventual outcome of which would be to obliterate the existing cliffs, shore platforms and sandy coves in the sector extending about 200 metres southwards. The Black Rock and Sandringham Conservation Association protested, and in October 1970 the Secretary for Lands directed that the dumping of rubble be stopped. After much discussion between the organisations concerned (including the Port Phillip Authority, the Board of Works, the Public Works Department and the Soil Conservation Authority) the Minister for Conservation, Mr. W. A. Borthwick, decided in June 1972 that

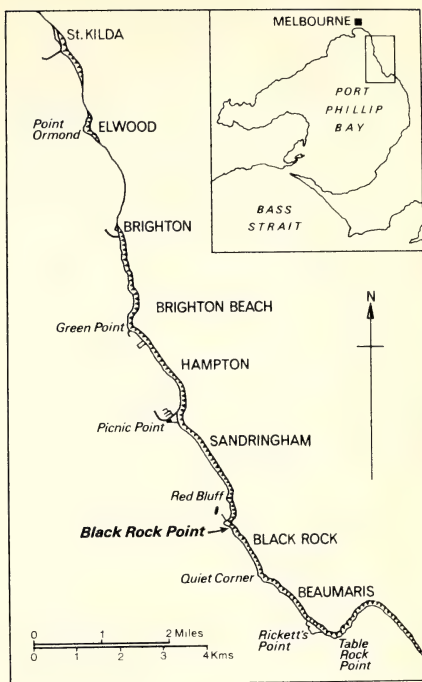


Figure 1

the dumped rubble should be removed, and that the cliffed coast at Black Rock Point should be left in its existing condition for a period of ten years, during which surveys and research work would be carried out to provide the information necessary to make a correct decision on the long-term management needed on this coastal sector.

In April 1973 the rubble was moved from the shore and banked against the seaward side of the car park. A detailed survey of the cliffed sector (Fig. 2) by N. J. Rosengren of the Melbourne University Department of Geography was carried out to provide a record against which subsequent changes can be monitored over the ten-year period. This article gives an account of the features of scientific interest at Black Rock Point, and the problem of their conservation.



Plate 1.

Photo: E. C. F. Bird

Geomorphology

The coastal landforms at Black Rock Point consist of rilled cliffs and scrub-covered bluffs behind a shore platform of ferruginous sandstone (Plates 2 and 3). There are two coves, each with small beaches of fine white quartz sand derived from erosion of the adjacent cliffs, while at the northern end, near the car park, is a beach of coarser brown quartz sand. The cliffs are capped by up to eight feet of pale grey dune sand, also

quartzose, resting on a black humic horizon which is clearly an ancient soil. Some sections show additional black soil layers within the dune formation (Plate 4). Between the cliff crest and Beach Road the sand-capped plateau bears a scrub and woodland vegetation.

The shore platform is gradually being undermined and dissected by wave attack at its outer edge, but waves reach the base of the cliff only during brief periods at high spring tides. Observations made during the past three

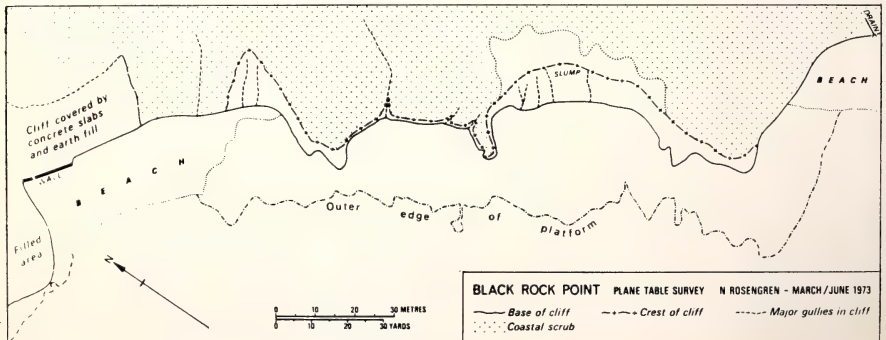


Figure 2

Plate 2

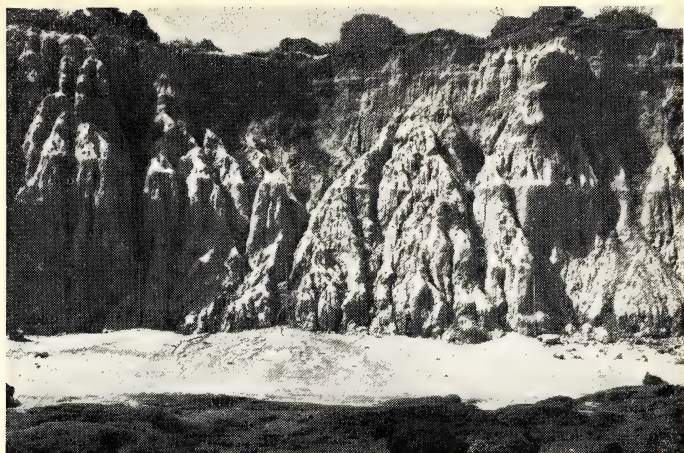


Photo: E. C. F. Bird

years show that erosion of the cliff face is largely due to surface runoff after episodes of heavy rainfall. This runoff is effective only in sectors where the dune capping at the cliff crest has lost its vegetation cover, and wind erosion has exposed the underlying soil surface. The surface slopes seaward (Plate 4), and as it is relatively impermeable, water runs off it during heavy rainfall and spills over the edge, scouring vertical rills and gulleys and washing out fans of fine sand that spread

across the beach and on to the shore platform. Plate 1 shows the correlation between a cliff sector subject to gulleying and the absence of cliff-top vegetation: on adjacent sectors, where cliff-top vegetation persists and the dune capping is intact, the cliff gives place to scrub-covered bluffs where the vegetation extends down almost to high tide level. Rain which falls in these sectors seeps into the ground instead of running quickly off the bare surface.

Plate 3



Photo: E. C. F. Bird

Cliff erosion by runoff was observed during the downpour which occurred on 17 February 1972. Detailed measurements were made on 3 and 4 February 1973 when, after a prolonged dry spell, about 5 inches (127 millimetres) of rain fell at Black Rock within 36 hours. Minor slumping occurred on the cliff face during this episode, but the bulk of the erosion was achieved in the form of gully gravuring by rainwash. Surveys of the fans of down-washed sand along a 15 metre section at the base of the cliffs (here about 8 metres high) showed that some 0.55 cubic metres of sand had been deposited. This represents an average recession of the cliff face of about 0.6 centimetres, but actual recession of up to 8 centimetres was measured at the head of the larger gulleys. Subsequent episodes of light rainfall produced no measurable erosion, and it was therefore not possible to estimate annual erosion (mean annual rainfall at Black Rock is about 25 inches or 635 millimetres) by simple multiplication of the erosion measured during this five-inch downpour. Further observations should indicate the intensity of rainfall needed to achieve erosion here.

The fans washed down in February persisted until April, when they were cut away by wave scour during high spring tides. Cliff recession is thus due largely to the combination of cliff-face

erosion by runoff during heavy rains and removal of cliff-base fans by storm waves during high tides. Sea spray also reaches these cliffs during storms, but its effects are insignificant compared with rainwash. The cliffs are also damaged when people scramble up or down them, but the extent of this kind of erosion has not yet been assessed.

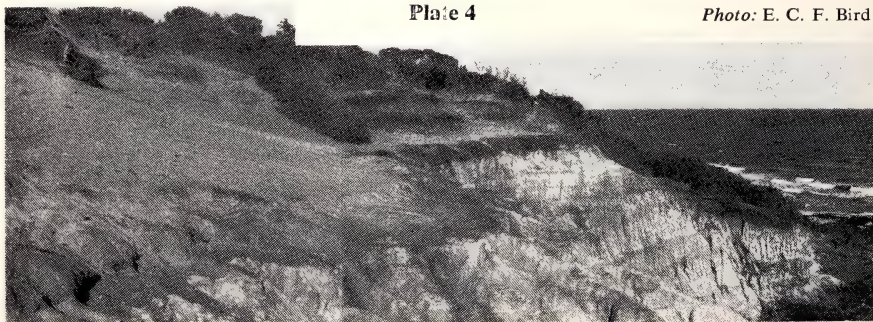
Further evidence that the rate of cliff recession at Black Rock Point is slow was obtained by comparing air photographs taken in December 1945 and January 1972. During this interval the cliff crest receded no more than one or two feet. At this rate it would be at least 100, and perhaps as much as 300 years, before there was any serious risk that erosion would undermine Beach Road.

Landform Evolution

Evolution of the coastal topography at Black Rock Point should be considered in terms of the world-wide rise of sea level to its present position, attained within the past six thousand years (Bird 1968, p. 45). Port Phillip Bay had existed in similar form at earlier stages, but its bordering sea cliffs had been degraded to bluffs during low sea level phases. As the sea rose, these bluffs were attacked by wave action to develop new sea cliffs, especially where the softer Red Bluff Sands outcropped. Where the top of

Plate 4

Photo: E. C. F. Bird



the more resistant Black Rock Sandstone stood at, or slightly above, sea level it was exhumed as a shore platform when waves cut back the overlying sands.

This was the situation at Black Rock Point. Fig. 3 shows the probable sequence of stages. The initial slope ABCD was attacked by marine erosion, the Red Bluff Sands (dotted) retreating more quickly than the Black Rock Sandstone (ruled horizontally) so that profiles aa', bb', cc' and dd' existed successively, the seaward edge of the shore platform retreating more slowly (B to E) than the base of the cliff (B to F) so that the platform has gradually broadened to its present dimensions (EF). Assuming that the sea remains at its present level, further evolution will depend on the relative rates of recession of points E and F. Since the base of the cliff is now only reached infrequently by wave action, it is inferred that it will not be cut back much further before the rate of retreat slows down sufficiently for sub-aerial processes of slope evolution to become dominant in shaping the cliff. The cliff crest will continue to retreat as the result of gulley incision and slope wastage, but without regular removal of the basal fans of down-washed sand by wave attack it will eventually decline to the profile FD. At this stage, vegetation is likely to have colonised it naturally, and stabi-

lised it. Thereafter, the cliff base F will recede only at the slow rate of retreat of the outer edge of the shore platform, E; it will be attacked by wave action only on rare occasions when a severe storm happens to coincide with an exceptionally high tide.

Applied to the sector shown in Plate 1, this prediction needs slight modification. The largest gully, in the centre of the cliffed sector (Plate 5), is being cut back more quickly than its neighbours, and will probably grow into a small valley similar to the existing wider, well-vegetated valley that opens into the next cove to the north.

It is thus likely that the rate of natural cliff recession will diminish, so that the estimate of 100 to 300 years for recession to Beach Road is an under-estimate. It is possible that the impact of intensified and unrestricted usage of the area by an increasing visitor population will impede the attainment of natural stability; it is possible that some unexpected change, such as a rapid rise of sea level, will accelerate cliff recession. However, in practical terms, the threat to Beach Road is here so remote as to be irrelevant to the problem of coastal zone management at Black Rock Point.

A Site of Scientific Interest

The cliffs and shore platform at Black Rock Point exhibit several features of scientific interest, and are

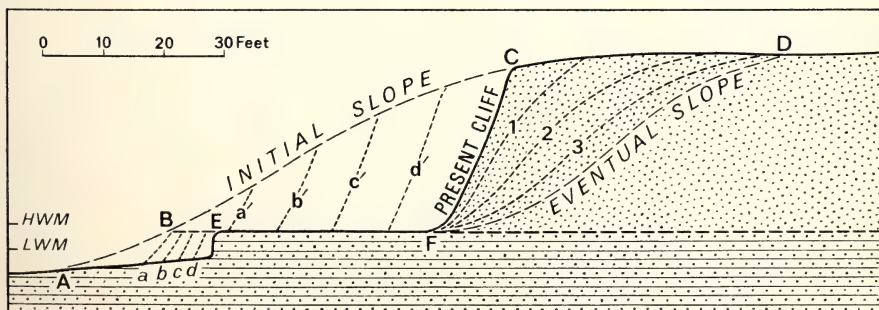


Figure 3.

visited frequently by school and university groups. The geological and biological features of the area would be concealed or destroyed if foreshore reclamation and anti-erosion works were to proceed.

Prominent in geological interest is the problem posed by the so-called Red Bluff Sands and Black Rock Sandstone formations. It is not certain that these are distinct formations. Cliff sections show that the junction between the two is irregular, and could be interpreted as a boundary between ferruginised and de-ferruginised zones in rocks that otherwise show little lithological variation. One layer of coarse quartz granules can be traced laterally from the brown ferruginised rock into the paler sands. According to Gill (1957) the sediments were laid down originally in a lagoon or nearshore environment; they show a transition from marine fossils below to estuarine fossils and remains of land plants above, suggesting accumulation during a phase of shallowing at the head of an ancestral Port Phillip Bay. The ferruginised rock contains structures which appear to be relics of driftwood deposited in the Tertiary

sediments, the organic materials having been replaced by iron oxides.

The lithological contrast in the rocks that outcrop at Black Rock Point may result from a past phase of deep weathering akin to that which produces lateritic soils in humid tropical environments. Iron oxides removed from the pale, unconsolidated Red Bluff Sands could have been deposited to enrich the underlying ferruginised rock. This hypothesis requires further investigation, which will be impeded if foreshore reclamation and anti-erosion works were to conceal the geological evidence. Moreover, if and when this geological problem is resolved, the sections should remain on view for educational use.

Near the top of the cliffs, layers of shell, charcoal and organic material in a sandy matrix are remains of an Aboriginal kitchen-midden of unknown date, formed during a phase when the Aborigines used this site to feast on locally-caught shellfish.

Such features merit the classification of Black Rock Point as a Site of Special Scientific Interest. In addition, the ten-year study of geomorphological changes and accompanying vegetation



Plate 5

Photo: E. C. F. Bird

changes will make Black Rock Point an "outdoor laboratory" for environmental research. One result of the controversy over reclamation and stabilisation of this coastal sector was the initiation of a project to list other Sites of Special Scientific Interest on the Victorian coast: this will be discussed in a subsequent article.

Aesthetic and Recreational Values

The suggestions that the cliffs at Black Rock Point be artificially stabilised appears to have been prompted to some extent by a belief that all erosion is evil, and must be halted. While soil erosion on farmland is obviously undesirable, erosion on coastal cliffs is a different matter: quite apart from the scientific interest of geological exposures, geomorphological forms, and ecological features, such cliffs have an aesthetic appeal to many people. Few would wish to see the magnificent coastal cliffs of the Port Campbell district converted into artificially stabilised, vegetated slopes, and the rugged cliff scenery at Cape Schanck on the Nepean coast, and on parts of Phillip Island, is an essential part of the scenic attraction for visitors to these areas. Perhaps there is a case for halting cliff recession where valuable property is threatened, but public sympathy may be declining for people who have built roads and houses too close to the crests of actively-receding cliffs.

The cliffs at Black Rock Point are clearly of interest to the many people who visit this part of the shore, in winter as well as in summer. A preliminary enquiry into their motives for coming here showed that many regard the area as an attractive segment of wild or natural environment, appreciating it both as a particular feature, and as an element of diversity on a coastline that is otherwise rather

monotonous. People use the small sandy coves here in summer, especially on windy days, and the shore platform provides an environment of rock pools, clefts, ledges and islets which functions as an adventure playground for children. Anglers fish from the rocks, and skin divers explore the nearby sea floor. In its present condition, Black Rock Point is of recreational value, offering a contrast in seaside environment from the beaches to north and south.

Conclusion

Black Rock Point is a site of scenic and scientific interest, offering opportunities for both educational and recreational activities. The decision by the Minister for Conservation to defer consideration of coastal engineering works here for ten years to permit scientific study and research was an important precedent: Black Rock Point is the first of Victoria's coastal Sites of Special Scientific Interest to be treated in this way. The results of the ten-year study will enable a management plan to be developed for this sector of coast, taking full account of scenic, scientific, educational and recreational values.

ACKNOWLEDGEMENT

We are grateful to Mr. H. J. Collier for drafting the diagrams.

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The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name

[continued from 90 (8)]

by JAMES A. BAINES

***Moraea.** After Robert More (1703-1780), of Shrewsbury, a keen amateur botanist. He travelled in Europe, and was a friend of Linnaeus. F.R.S. in 1729. (*M. xerospatha*, Thread Iris, is now *Gynandris setifolia*.)

Morgania. Named by R. Brown after Hugh Morgan (fl. 1540-1576), apothecary to Queen Elizabeth I. He established private botanical gardens in central London and at Battersea, and introduced several new plants to England. He was described by Gerard as "a curious conservator of simples".

Muehlenbeckia. Named by Meissner after Henri Gustave Muehlenbeck (1798-1845), a physician at Mulhouse, France (the surname is German, and means "mill on the creek").

Muellerina. Named by Van Tieghem after Baron Ferdinand von Mueller (Sir Ferdinand Jakob Heinrich Mueller) (1825-1896), M.D., F.L.S., F.R.S., K.C.M.G. (and innumerable other honours), Victoria's Government Botanist and Director of Melbourne Botanic Gardens, the greatest 19th Century botanist working in Australia, who won world-wide recognition for his achievements as a systematic botanist (Bentham's *Flora Australiensis* was mainly his work) and as an explorer. (See *By Their Fruits*, by M. Willis, and *Ferdinand von Mueller*, by Alec H. Chisholm, but the definition biography is yet to be written.)

***Navarretia.** Named by Ruiz and Pavón after Francisco Fernando Navarrete, a Spanish physician. Our introduced species is Californian Stinkweed (Skunkweed in U.S.A.).

Nicotiana. Named by L. after Jean Nicot (1530-1588), French ambassador to Portugal from 1559 to 1561, who received from a Flemish gentleman the first seeds of tobacco, which he sent to Catherine de Médicis. She named it at first "the ambassador's herb", but it was called Nicotiane by the Duc de Guise. Linnaeus adopted this name for the genus in its Latin form.

Oschatzia. Named by Walpers after Herr Oschatz, in 1849. This umbelliferous plant has been placed in various genera, including *Azorella*, *Pozoa*, *Microsciadium* and *Centella*.

Pandorea. Named by Spach after Pandora of the famous Greek myth. The word means "all-gifted", in reference to the box from which all "gifts" escaped except Hope when she lifted the lid. The specific name is also from Pandora (*P. pandorana*).

***Parentucellia.** Named by Viviani after Tomaso Parentucelli, founder of the botanic gardens in Rome, Orto Botanico. The genus was set up in 1824. Our species were long known as *Bartsia*.

Parsonsia. Named by R. Brown after James Parsons (1705-1770), M.D., F.R.S., a London doctor, author of *Microscopical Theatre of Seeds* and *Pharmacopoeia Edinburgensis*. *P. brownii* was formerly known as *Lyonsia straminea*.

Patersonia. Named by R. Brown after Colonel William Paterson (1755-1810), Lieutenant-Governor of N.S.W. in early Sydney, and founder of Launceston, Tasmania, who had studied botany in England and dedicated

an account of his travels in South Africa to Sir Joseph Banks, who used his influence to gain him a captaincy in the N.S.W. Corps (probably with the idea of furthering the study of botany there). He challenged John Macarthur to a duel, but supported Major Johnston in the aftermath of the mutiny against Governor Bligh, whom he insisted must return to England. Chisholm states that he was more interested in natural history than in public affairs during his period in charge of northern Tasmania. *Caladenia patersonii* is one of a number of specific names honouring him. He named the Grose Valley when exploring in the Blue Mountains, and Paterson River (N.S.W.) and the town of Paterson are named after him.

Persoonia. Named by Smith after Christiaan Hendrik Persoon (1755-1837), born in South Africa, but became a famous mycologist in Paris, where his work on the classification of fungi was extremely important. The most significant of his numerous writings was *Mycologia Europaea* (1822-1828). His father was Dutch and his mother a Hottentot. The surname Persoon means "person" in Dutch.

Posidonia. Named by Koenig after Poseidon, the Greek god of the sea (= Neptune). The name is apt, as it is a submarine plant (known as Fibreball Weed).

Protea. The name given by Salis-bury in 1796 to Drumstick Conebush was *Protea anemonifolia*, but *Protea* is solely an African genus, and its present valid name, *Isopogon anemonifolius*, came into use in 1809. The family Proteaceae is represented in Australia by many genera, recalling yet another classical figure, Proteus, who was able to assume many shapes when seized in the hope of getting him to prophesy the future. The many guises of the plants made the name seem appropriate.

Puccinellia. Named by Parlatore in 1848 after an Italian botanist named Puccinelli of Lucca. (*Puccinia*, a genus of fungi with nearly 4,000 species, was named after Th. Puccini, professor of anatomy in Florence.)

Pultenaea. Named by Smith after Richard Pulteney (1730-1801), M.D., F.L.S., F.R.S., an English botanist-surgeon, who practised his profession first at Leicester and then for 36 years at Blandford, Dorset. He wrote on Leicestershire plants, and left an unpublished manuscript *Flora Anglica*.

Quinetia. Named by Cassini possibly after Edgar Quinet (1803-1875), a French historian and politician. (The specific name *urvillei* is, of course, after Dumont d'Urville.)

***Reichardia.** Roth named this composite after Reichard in 1787; nevertheless he named plants *Reichardia* subsequently in two other families: Scrophulariaceae (1800) and Leguminosae (1821), both of course invalid. After J. J. Reichard, 1743-1782, director of Frankfurt botanical gardens.

Richea. Named by R. Brown after Claude Riche (1762-1797), doctor and botanist on the *Esperance* (one of the two French frigates on the d'Entrecasteaux expedition). He was lost on a shore trip near Esperance Bay, W.A., and was searched for in vain by men from that ship and the *Recherche*. He had been first secretary of the Philomathic Society of Paris.

***Romulea.** Named by Maratti after Romulus, the legendary founder of Rome, 753 B.C., after his quarrel with his brother, Remus.

Rulingia. Named by R. Brown after Dr. Johann Philipp Rueling (born 1741), a German botanist. The absence of the e indicates that he probably spelt his name Rüling, with a diaeresis over the u. He wrote an essay on the Natural Order of Plants.

Rumohra. Named by Raddi after Karl Friedrich von Romohr, born near Dresden in 1785; studied art and became an historian in this field; made many journeys to Italy; died 1843 at Dresden.

Ruppia. Named by L. in 1753 after H. B. Ruppius (1689-1719), a German botanist. (Ruppius is the Latin form of the German surname Rupp, derived from the short form of Ruprecht or Rupert, and is therefore the same name as that for Rev. Herman M. R. Rupp (1872-1956), author of *The Orchids of New South Wales* and many papers on orchids in the *Victorian Naturalist*.)

Scaevola. Named by L. after Caius Mucius Scaevola, a hero of ancient Rome. After Horatius at the bridge had saved Rome from immediate invasion by Lars Porsena, king of the Etruscans, the city was besieged, Mucius, disguised, sallied out to kill the king, but stabbed his similarly dressed secretary instead. Seized, and threatened with torture, he thrust his right hand into the fire on the altar and let it burn to show how he despised pain. Porsena in admiration of his courage let him go free, and the Romans henceforth called him Scaevola, meaning "the left-handed". Linnaeus named the genus from the spread-fingered appearance of the corolla.

Schelhammera. Named by R. Brown in 1810 after C. C. Schelhammer, a professor at the University of Jena in Germany. The name originated as a dialect word for a blacksmith, meaning literally "let the hammer sound loudly".

***Schkuhria.** Named by Roth in 1797 after a German named Schkuhr. Our introduced species is a South American native. Moench named another composite *Schkuhria*, which is now *Sigesbeckia*. Christian Schkuhr was born in 1741 at Pegau, studied plants at Wittenberg University, died 1811. Author of "Encheiridium Botanicum", in addition to works on Germany's cryptograms and sedges.

Selliera. Named by Cavanilles after François Noël Sellier (1737-c. 1800), of Paris, engraver of botanical illustrations for Cavanilles and Desfontaines between 1780 and 1800.

***Sherardia.** Named by L. in 1753 after William Sherard (1659-1728), D.C.L., F.R.S. He was born Sherwood, and studied botany under Tournefort. Consul at Smyrna from 1703-15. He brought Dillenius to England, and founded a chair of botany at Oxford, where the Sherardian Professor was endowed through a legacy of £3,000. He bequeathed also his library, herbarium and manuscripts. Linnaeus said he was "known among botanists as GREAT". The genus is monotypic (Field Madder).

Siebera. Now *Platysace*, this genus was named by Reichenbach after Franz Wilhelm Sieber (1789-1844), of Prague, natural history collector, who travelled to Italy, Crete, Egypt, Palestine, Mauritius, Australia and South Africa in search of new plants, and sent other collectors elsewhere. He is also commemorated in the specific names of *Eucalyptus sieberi*, *Crassula sieberana*, *Pomaderris sieberana*, *Calistemon sieberi* and *Viola sieberana*.

(to be continued)

Australian Natural History Medallion 1973

The Award Committee has named Mr. Edmund D. Gill as the winner of the 1973 Natural History Medallion.

The Geology of Port Fairy, Western Victoria, Australia

by EDMUND D. GILL* AND
KATHLEEN W. GILL

One of the oldest settlements in Victoria is Port Fairy. One reason for this is that its masses of heavy basalt provided shelter from the south-westerly gales for the numerous small ships sailing the coast early last century. The same material, ready to hand, was used extensively for building, because the migrants from cold England believed that the only type of house worth building was a stone one. Port Fairy, for its size, has more buildings classified by the National Trust as worthy of preservation than any other town in Victoria. The site of Port Fairy (originally called Belfast), was created by the basalt flow that provides its foundations, and the history of the basalt is largely the history of the area.

Anomalous Coast

The coast of Western Victoria is on a saw-tooth pattern with the sides of the teeth oriented north-east and south-west. From Port Fairy to Cape Reamur, however, there is a stretch of coast of anomalous direction, because it runs east-west. The reason for this is that the coast cuts across a valley infilled with basalt at right angles to its direction of flow (north-south). This basalt is called the Woodside Basalt after the property north of the town.

But why is this basalt where it is? The answer is that it occupies an ancient valley that ran from north to south. Molten lava, like water, follows the lowest parts of the land. The

*Deputy Director, National Museum of Victoria.



Plate 1 — Eastern Beach, Port Fairy.

The beach and dune have been built since the sea returned to its present level about 6,000 years ago. The underlying basalt is about 300,000 years old.

fossil valley belongs to the ancestor of the Moyne River. This ancestral Moyne flowed approximately through the site of the present water tower, but about 100 feet (30 m) below the present level of the sea! This was possible because the coast at that time was somewhere in the vicinity of the edge of the continental shelf over 30 miles (50 km) from the present shore.

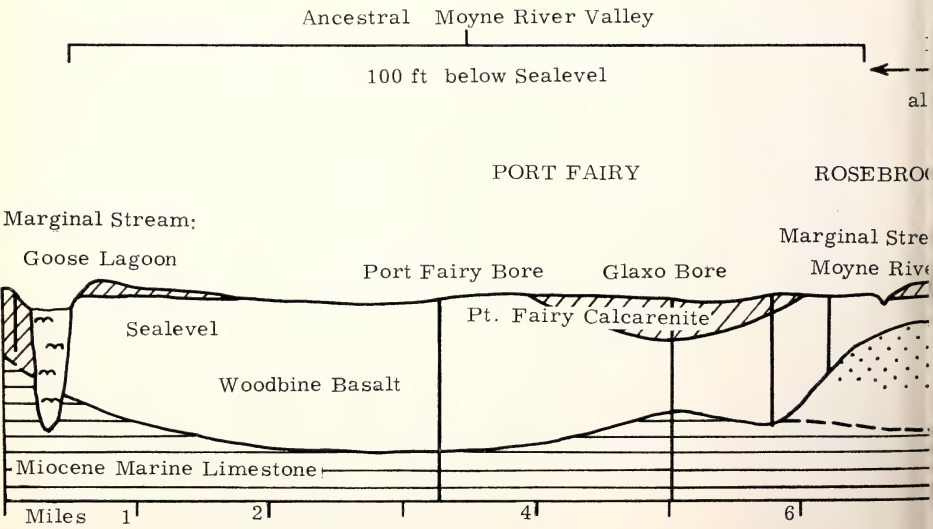
The time of eruption was the Glacial Stage before last. During the Glacial Stages, water was trapped on land in the form of giant polar ice caps, so that the level of the sea fell to at or near the edge of the continental shelf. This is how it came about that the ancestral Moyne was flowing in a valley cut to about 100 ft. (30 m) below present sea level at the present coastline. The old Moyne River wandered across the plain formed by the sea vacating the continental shelf, and fell into the sea some 30 miles south of Port Fairy. The site of Port Fairy was then in air space above the land far from the shore! When the molten lava flowed (from an eruption point not yet dis-

covered), the valley was filled with basalt, and so the site of Port Fairy came into being. The obvious volcanic peaks in the district are not the source of this basalt; they are far too young.

So the ancestral river died, drowned under a flood of molten lava that clogged its valley.

Rivers of Red Hot Lava

The valley of the ancient Moyne did not get filled by a single lava flow. Basalt flow after basalt flow erupted from the volcano until 145 feet (44 m) of rock had been piled up. The Port Fairy water bore penetrated this thickness of basalt. Because there was such a thick suite of flows, the lava spread out to form a band about 5 miles (8 km) wide. The Crossley Scarp, a limestone cliff behind Tower Hill Swamp, ends where it does because cut off by the valley of that ancient river. When the basalt overfilled the valley of the prior Moyne, it spread along in front of the scarp as far as Killarney, but no further. The close proximity of the Tower Hill



volcano has given rise to the idea that the Killarney lava came from there, but this is not so. Fig. 1 shows that the lava from Port Fairy gradually thins in that direction but does not reach Tower Hill. As can be seen by the bores near Tower Hill shown in that figure, none of them pierced basalt.

River Finds a New Route

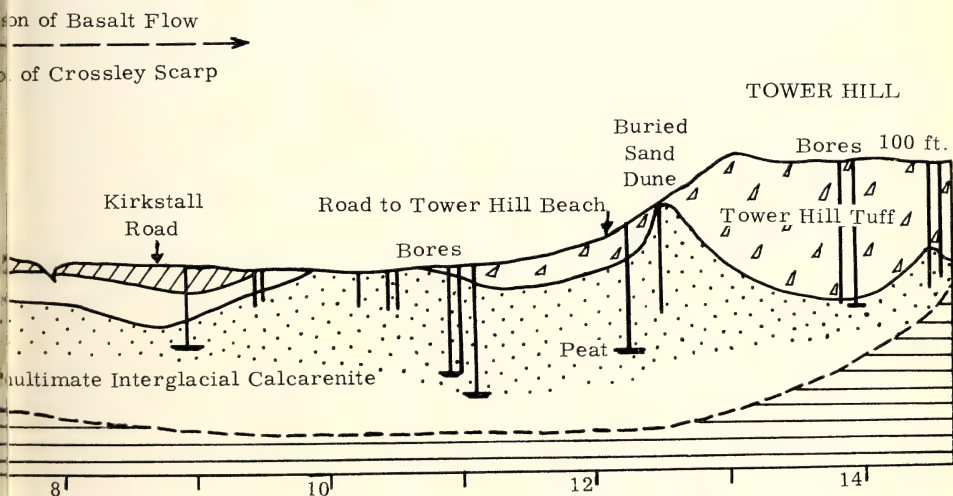
Water has a way of finding a path for itself. The Moyne watershed still needed a drainage route as its old valley filled with lava. This was eventually established marginal to the basalt, except at Rosebrook where the lava flow spread in front of the Crossley Scarp. Somehow it found a path across the basalt there, but has never cut a very deep channel because basalt is so difficult to erode. Goose Lagoon is the remains of a marginal stream on the west side of the lava field. During the last Glacial Stage, this stream cut deeply into the comparatively soft rocks there. Bores in this area have penetrated 70 feet (21 m) without meeting the bedrock (Miocene marine

limestone such as can be seen at "Aringa").

So Port Fairy is founded on a lava flow that issued from the earth during the Glacial Stage before last (the Penultimate Glacial) when sea level was low, and rivers were entrenched deeply into the terrain. A radioactive dating of this basalt by Dr. Ian MacDougall of Canberra has given an age of about 300,000 years.

Ancient Shellbeds

Before myxomatosis was discovered, during a rabbit plague, one of us (E.D.G.) wrote a newspaper article on "my friends the rabbits"! It was explained that although rabbits were a pest, they assisted considerably by digging out what was under the ground. They provided eyes beneath the earth. In many places around Port Fairy they dug out sand rich in marine shells. The drain across the Highway at the north end of the town had been dug shortly before, and its walls revealed layers of beautifully preserved marine shells, including some not now living on the Victorian



fossil valley belongs to the ancestor of the Moyne River. This ancestral Moyne flowed approximately through the site of the present water tower, but about 100 feet (30 m) below the present level of the sea! This was possible because the coast at that time was somewhere in the vicinity of the edge of the continental shelf over 30 miles (50 km) from the present shore.

The time of eruption was the Glacial Stage before last. During the Glacial Stages, water was trapped on land in the form of giant polar ice caps, so that the level of the sea fell to at or near the edge of the continental shelf. This is how it came about that the ancestral Moyne was flowing in a valley cut to about 100 ft. (30 m) below present sea level at the present coastline. The old Moyne River wandered across the plain formed by the sea vacating the continental shelf, and fell into the sea some 30 miles south of Port Fairy. The site of Port Fairy was then in air space above the land far from the shore! When the molten lava flowed (from an eruption point not yet dis-

covered), the valley was filled with basalt, and so the site of Port Fairy came into being. The obvious volcanic peaks in the district are not the source of this basalt; they are far too young.

So the ancestral river died, drowned under a flood of molten lava that clogged its valley.

Rivers of Red Hot Lava

The valley of the ancient Moyne did not get filled by a single lava flow. Basalt flow after basalt flow erupted from the volcano until 145 feet (44 m) of rock had been piled up. The Port Fairy water bore penetrated this thickness of basalt. Because there was such a thick suite of flows, the lava spread out to form a band about 5 miles (8 km) wide. The Crossley Scarp, a limestone cliff behind Tower Hill Swamp, ends where it does because cut off by the valley of that ancient river. When the basalt overfilled the valley of the prior Moyne, it spread along in front of the scarp as far as Killarney, but no further. The close proximity of the Tower Hill

volcano has given rise to the idea that the Killarney lava came from there, but this is not so. Fig. 1 shows that the lava from Port Fairy gradually thins in that direction but does not reach Tower Hill. As can be seen by the bores near Tower Hill shown in that figure, none of them pierced basalt.

River Finds a New Route

Water has a way of finding a path for itself. The Moyne watershed still needed a drainage route as its old valley filled with lava. This was eventually established marginal to the basalt, except at Rosebrook where the lava flow spread in front of the Crossley Scarp. Somehow it found a path across the basalt there, but has never cut a very deep channel because basalt is so difficult to erode. Goose Lagoon is the remains of a marginal stream on the west side of the lava field. During the last Glacial Stage, this stream cut deeply into the comparatively soft rocks there. Bores in this area have penetrated 70 feet (21 m) without meeting the bedrock (Miocene marine

limestone such as can be seen at "Aringa").

So Port Fairy is founded on a lava flow that issued from the earth during the Glacial Stage before last (the Penultimate Glacial) when sea level was low, and rivers were entrenched deeply into the terrain. A radioactive dating of this basalt by Dr. Ian MacDougall of Canberra has given an age of about 300,000 years.

Ancient Shellbeds

Before myxomatosis was discovered, during a rabbit plague, one of us (E.D.G.) wrote a newspaper article on "my friends the rabbits"! It was explained that although rabbits were a pest, they assisted considerably by digging out what was under the ground. They provided eyes beneath the earth. In many places around Port Fairy they dug out sand rich in marine shells. The drain across the Highway at the north end of the town had been dug shortly before, and its walls revealed layers of beautifully preserved marine shells, including some not now living on the Victorian

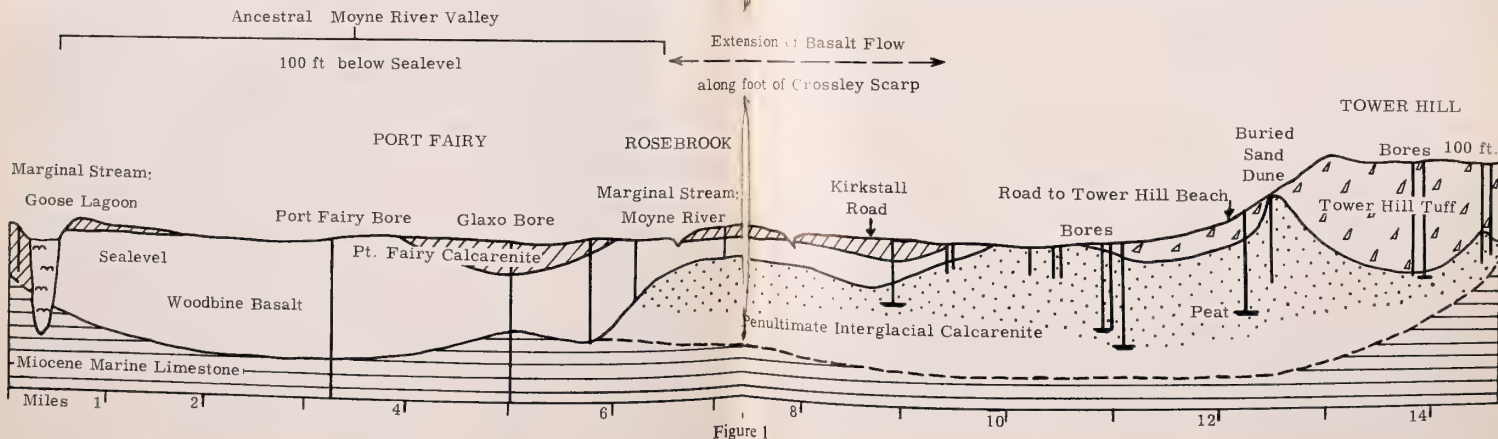


Figure 1

coast. The rabbits revealed something of the extent of this shellbed.

The formation was first reported in connection with the study of changes of sea level (Gill and Fairbridge 1953, Gill 1954, 1956). Later, Professor J. W. Valentine of U.S.A., who spent a Fulbright Scholarship year here, made a detailed study of the mollusca of the Port Fairy Calcarene (as the formation is called). He determined over 300 species of molluscs — a remarkably rich fauna. The Foraminifera have been studied by Mr. Arthur Collins (1953) of Geelong. More recently, a new fauna exposed in the Goose Lagoon drain has been recorded (Gill 1971).

So the flat occupied by the business area of Port Fairy was once a seabed; the horizontally laid shelly sand accounts for its flatness. During the digging of sewerage trenches in recent years both the shelly sand and the underlying basalt have been revealed. Then where was the shore at the time this bed was laid down? It was approximately at the 25 ft. (7.5 m) contour. On the north-east corner of the intersection of the Princes Highway and Bank Street, well-rounded basalt boulders, shells and shell-sand are cemented together. This is a part of this ancient shore. On the present coast there are many places where boulders are mixed with shells and sand in similar manner. At that time the sea reached the Crossley Scarp and overlapped the basalt in the lower lying areas. It occupied Goose Lagoon, and also the flats between Narrawong and the east side of Portland.

Dating the Past

When was this sea over Port Fairy, and when did it cover the low country west and north of the town? When the original work was done, radiocarbon dating had been only recently invented. The Turban Shell *Ninella tor-*

quata is an index fossil for the Port Fairy Calcarene (shellbeds) because it no longer lives in Victoria. So the opercula of this species were used for a dating. The assay showed that the formation was beyond the range of radiocarbon dating. Because the fauna indicated warmer water species, and the height of the sea level on this unusually stable coast stood at 25 ft. (7.5 m) it was thought that the age was Last Interglacial. Professor Valentine confirmed this by a uranium/thorium assay that gave an age of about 125,000 years.

Stranded Dunes

When the sea retreated from its high stand about 125,000 years ago, it left behind some dunes of lime sand. The Princes Highway traverses one from Tower Hill to Port Fairy, and more can be seen along the Princes Highway between Port Fairy and Goose Lagoon. The rain of the intervening years has dissolved lime and redeposited it as calcrete (natural concrete) which has formed a hard shell over the ancient dunes, so protecting them. These dunes are case-hardened. The sea then retreated to its latest low level, between 18,000 and 20,000 years ago, and about 6,000 years ago once more reached approximately its present level, with only small oscillations since then. The return of the sea meant the return of coastal dunes to the area. Thus the Eastern Beach (Plate 1) and the dune behind it are the result of the sand piled up by the sea in recent millenia; likewise the soft dunes along the Port Fairy/Cape Reamur coast, and at Goose Lagoon.

A basal soil in this modern dune line at Tower Hill Beach dated 5,120 years by radiocarbon, while another soil near the top of the dune dated 2,800 years. Both have Aboriginal middens in them. This soil has now been dated at Warrnambool, Goose

Lagoon, McKechnie's Craigs and other places, and all the dates are of the same order of age. It is not to be expected that they will be the same because such a soil takes a long time to form, and the datings are done on Aboriginal middens within them that date a particular event in that period. A midden in Tower Hill Tuff between Point Pickering and Thunder Point at Warrnambool gave a date of 7,300 years, which is the best date so far for the eruption of that volcano (Gill 1972).

Complex Coast

A whole book could be written on the geology of Port Fairy and its environs, but for this brief account one other group of features should be mentioned, as they are rather unusual. Captain Barrow (1854) made the original survey of Port Fairy harbour. The Back Passage then led right through to the Moyne River, and there were two other small inlets north of it, now filled in. Along the coast there are other similar elongate narrow channels between reefs. Another feature is the circular bays and domes. At the seaward end of the Back Passage, on the south side, there is a circular bay, with a still smaller one on its west side. There are many such circular bays along the coast such as Horseshoe Bay and Leura Bay. Many domes of basalt (tumuli) can be seen, as at Drain Bay, and on the west side of Cape Reamur. Some can be seen inland from the Princes Highway west of Port Fairy.

The Woodside Basalt had a high gas/lava ratio, causing it to be full of bubbles. Sometimes this gas accumulated and caused an up-doming of the surface of the lava flow while it was still soft. This is probably how the domes were formed; they are too regular to be due to pressure ridging. In other places these domes collapsed, leaving rounded bays with the basalt

dipping inwards all round. The dips can be as steep as 30°. Narrow channels like the Back Passage are thought to be due to lava tunnels collapsing. In such basalt, the lava can cool on top and the still molten lava flow out from underneath, thus forming a tunnel. Sometimes such tunnels remain, as at Byaduk, Mt. Napier, Panmure, and many other places. At other times they collapse, and then can be recognized by the sides dipping inwards. The bubble lines that were horizontal now dip towards the channel. Joints that once were vertical are now at an angle. To walk along the south side of the Back Passage and round the circular bay at the seaward end is the easiest way at Port Fairy to observe what these features are like. The sea has washed away the soil, making them easy to see.

These interesting features are very well preserved because the basalt is so hard, so heavy, and so tough that it is only slowly eroded. In many places, Port Fairy Calcarene laid in the basalt joint 125,000 years ago can still be seen there on the shore platforms, showing that the sea has made little impression on it in the past 6,000 years, since it returned to its present level.

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Traces left by the Aborigines on Phillip Island, Victoria

by A. E. SPILLANE

Illustrations by Author.

Phillip Island, Victoria, was discovered by George Bass in 1798, at the end of his historic journey from Port Jackson, in a whale-boat only 28 feet long, which carried him down the east coast of Australia.

The Island is situated at the entrance to Western Port Bay, and is 16 miles long, by $5\frac{1}{2}$ miles wide. The highest part of the Island is Cape Woolamai, which is 357 feet above sea level. The Eastern Passage, about half a mile wide, separates Phillip Island from the nearest point of the mainland, which is near San Remo. The climate is temperate, particularly in summer, when the hot north winds are considerably tempered by the waters of Western Port Bay. The annual rainfall is approximately 29 inches.

With its 30 miles of golden beaches, and beautiful coastal scenery, the Island has become a popular attraction

for thousands of summer visitors. In the not so distant past, it was also a favourite area for the Aborigines; as is proved by traces left by them in various parts of the Island.

When Bass discovered Western Port, the Bunurong tribe of Aborigines inhabited all adjacent areas of the mainland, so it is reasonable to assume, that it was natives from that tribe who occupied the Island from time to time. The main reason for the periodic visits, would have been food from the capture of Mutton-birds (*Puffinus tenuirostris*), Penguins (*Eudyptula minor*), and Seals (*Arctocephalus doriferus*). As these three animals commence breeding in November, the natives would presumably have been at their camp sites well before then, awaiting their arrival.

As the time spent on the Island by the natives would have been governed



Plate 1 — Cat Bay site.



Plate 2 — Uniface Pebble Implement, Woolamai Beach.

by the breeding cycles of the above animals, there could have been a substantial Aboriginal population in the area for five or six months each year.

In its natural state, the terrain was thickly covered by scrub, and it would have been an ideal habitat for many different types of birds and marsupials; which combined with shellfish from the rocky shore platforms, plus the sea birds which frequented the shores, would have supplied a change of diet.

Stone Implements

The main types of implements found on the Island, are edge-ground axes, pebble axes, anvils, hammer-stones, scrapers, and utilised flakes.

Upon examining refuse obtained from old camp sites, one is soon made aware of the abundance of flaked pieces of stone; however, microlithic implements of the type usually found at other Victorian sites are very scarce. Perhaps this problem could be accounted for by the fact that suitable stone for flaking was obtained in abundance from the coastal shingles; consequently, flakes of the desired shapes were probably discarded after using once. The knowledge that their stay on the Island would be of only

short duration, would not have supplied the natives with sufficient incentive to strive for the production of the classic types of artifacts. A large proportion of the utilized pieces of stone, appear to have been used either as scraping or cutting implements.

Camp Sites

On the southern shore of the Island, about three miles from the San Remo bridge; the sea comes rolling in from Bass Strait and pounds upon a magnificent stretch of beach. This is an area with large Mutton-bird rookeries. High up on top of the cliffs, scattered through the sandy stretches of country, can be found stone relics, left by the Aborigines who came to collect the rich harvest that Nature provided for them. The main artifacts to be found, are knapped pieces of flint obtained from nearby beaches. An occasional knapped pebble axe may also be found.

A short distance inland from Forrest Caves, in a north-easterly direction, is a former camp site. The pre-

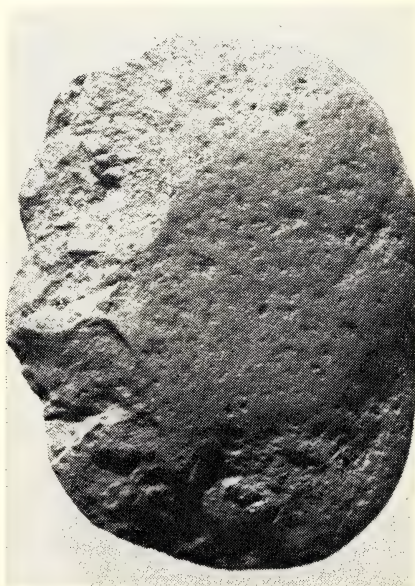


Plate 3 — Pebble Axe, Saltwater Creek.

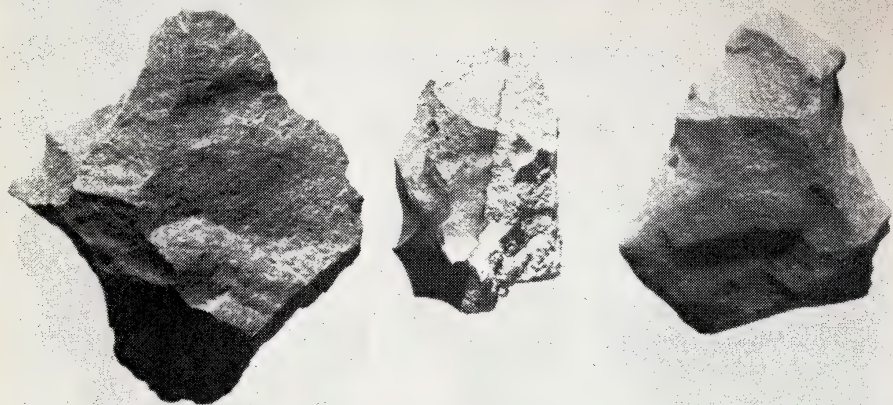


Plate 4 — Scrapers: *Left* — Saltwater Creek; *centre* — Point Grant; *right* — Cat Bay.

dominating implements found there, have been fabricated from either clear or opaque quartz.

There is an excellent example of a midden on top of the cliff at Point Grant, which is on the western extremity of the Island, overlooking the Nobbies. Scattered amongst the surface shells and charcoal, the writer found numerous flaked pieces of stone, and a good type of a scraper.

An old camp site is situated a short distance north-east of Saltwater Creek. Several stone flakes were collected here; also a typical specimen of a knapped basalt pebble axe, of the type found in the area. A quartzite concave scraper, was also found at this location.

Boat Creek is on the north-west of the Island. At its outlet to Western Port Bay, the remains of past native feasts, in the form of discarded shells, may still be observed.

One of the main camping grounds of the Bunurong people on Phillip Island, was situated at Cat Bay. It was on the rolling sand dunes overlooking the Western Passage, which separates

the Island from the Mornington Peninsula. The site had a lot in its favour from the natives' point of view. It was set amongst their beloved sand dunes, and was sheltered from the fierce Bass Strait winds; adequate water was available from nearby lakes, and a small creek which passed through the camp; but most important of all, it was close to one of the main breeding grounds of Mutton-birds, Penguins, and Seals; while just offshore was a rock platform, which would supply a large amount of shellfish.

Scattered over the camp site, are shells, knapped-pebble axes, anvils, hammer-stones, utilized flakes, scrapers, and occasionally, a microlith; mute reminders of a people who have vanished into the Dreamtime.

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SWAN BAY, QUEENSCLIFF

A proposal by a development firm to construct a marina on the former shell-grit works near Queenscliff is causing concern.

The main source of worry is that it will be necessary to dredge a channel across the southern end of Swan Bay to provide access to the marina — and this in turn may adversely affect the total area of Swan Bay as far north as Duck Island and Edwards Point.

The Geelong Field Naturalists' Club and the Geelong Environmental Council are working on the project, and additional support may be sought.

Meanwhile **Urgent Information** is needed — all bird notes, references and similar data about Swan Bay must be compiled if we are to ensure that there is no damage done to its fauna.

There appears to be an ornithological link between Swan Bay and Mud Islands, and if this can be proven, the immense value of Swan Bay becomes obvious.

Data should be sent to the G.F.N.C., care of: Trevor Pescott,
4 Victoria Terrace, Belmont, 3216.

Preliminary Results of Non-Marine Mollusc Census

by

BRIAN J. SMITH*

and

RHYLLIS J. PLANT*

The census of non-marine molluscs of Victoria has now been running for two and a half years and it was therefore felt that a brief report on the progress of the work so far would be of interest and value. A great deal of material has been collected both by the Museum staff and by interested people all over the State. From these records an interesting picture is emerging of the distribution of the various species. In many cases it is being discovered that species are far commoner and more wide-spread than was hitherto thought. In a number of cases large range extensions have been established by the census, also large collections of specimens of species needing taxonomic revisionary work are accumulating.

However there are still many gaps in the distribution maps as many areas have so far not been sampled. Even

in the areas from which material has been collected, more comprehensive collecting will undoubtedly reveal many more records.

Interim distribution maps of seven species are included to show the extent of recording so far; three introduced species and four native species.

Helix aspersa (Fig. 1). This map shows a scattered distribution all over the State, but mainly in the more populated areas. This is probably our commonest, most wide-spread, non-marine mollusc and for this reason I suspect it is not being collected. I would expect it from anywhere where man lives, from suburban gardens to around the chalets in the snow country, from isolated homesteads in the Sunset Country to around holiday houses on the coast. Ordinary garden snails and slugs will be very welcome

*Invertebrate Department, National Museum of Victoria.

as records from all parts of the State and especially from anywhere not marked on the map.

Theba pisana (Fig. 2) is the Dune snail. When the census started it was only known from a few coastal sand-dune areas of central Victoria. However in these areas this small white snail with brown bands was found in very large numbers. The map shows that it is now known from many localities along the coast of western and central Victoria. More collecting will fill in the gaps along these coasts. Surprisingly it has not been recorded so far from east of Phillip Island except for one isolated population at Tidal River on Wilson's Promontory. I feel sure this is not a true picture but rather reflects the lack of collecting in this area.

However the most surprising records of this species, arising as a direct result of increased interest in non-marine molluscs stimulated by the census, are the two records from north-western Victoria in the Irymple and Ouyen areas. Again I feel that these should be more widespread in these areas, but only more collecting can confirm this.

Cochlicella ventrosa (Fig. 3). This small conical snail is another introduced species proving to be very widespread throughout the State. Its small size makes it more difficult to find than *Helix* and I believe that this factor could explain its apparent less widespread distribution. This species is capable of a further penetration into native bush than any other introduced species of snail. One interesting, but probably false, impression given by map is its apparent absence from north-eastern Victoria. This is probably merely a lack of collecting in this area.

Cystopelta purpura (Fig. 4). This is the only species of native slug found in Victoria and before the start of the

census very little was known about its distribution within the State. It was generally considered to be fairly rare and restricted. However the census has proved this wrong as the map shows a widespread distribution over much of the southern and mountain areas of the State. This species is largely confined to fairly wet native bush areas of the more hilly country and is common in the rain-forest areas of the Great Dividing Range where it is found to over 1,200 m (4,000 ft.).

Records from the Glenelg River area of far western Victoria and records in the Grampians area have come to light as a result of the census. However the map reveals many gaps which can only be filled by more intensive collections.

Victaphanta atramentaria and *Victaphanta compacta* (Fig. 5). These two large black carnivorous snails have very restricted distributions confined to the rain-forest areas of the central Great Dividing Range and of the Otways respectively. The reason for this very restricted distribution is not known. This is thought to be a true picture of their distributions as these are large obvious species and have been extensively searched for in adjacent similar areas without success. This genus is known only from Victoria and western Tasmania.

Pygmipanda kershawi (Fig. 6). This is the largest native land-snail in Victoria and, as can be seen from the map, is confined to the East Gippsland area of the State. Recent work for the census has widened its known distribution west of Bairnsdale in the Macalister area, but much collecting is still needed in the Gippsland area to establish the true range of this species.

Much more material is needed, even for the common species, to enable meaningful distributions to be drawn up.

Fig. 1.

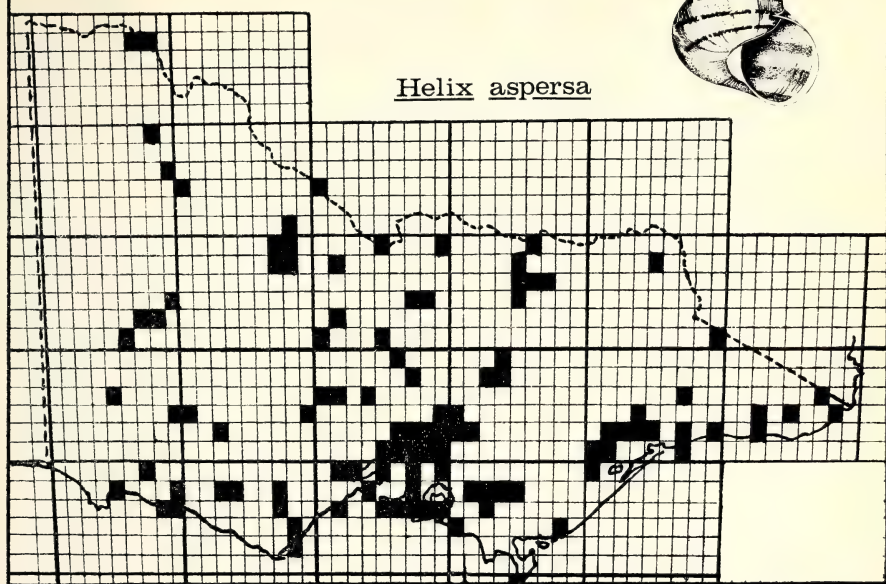


Fig. 3.

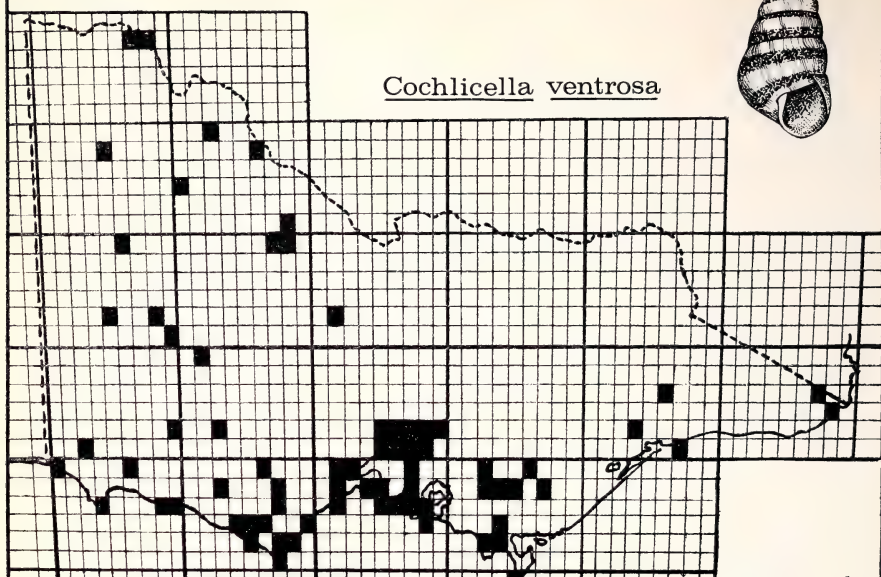


Fig. 4.

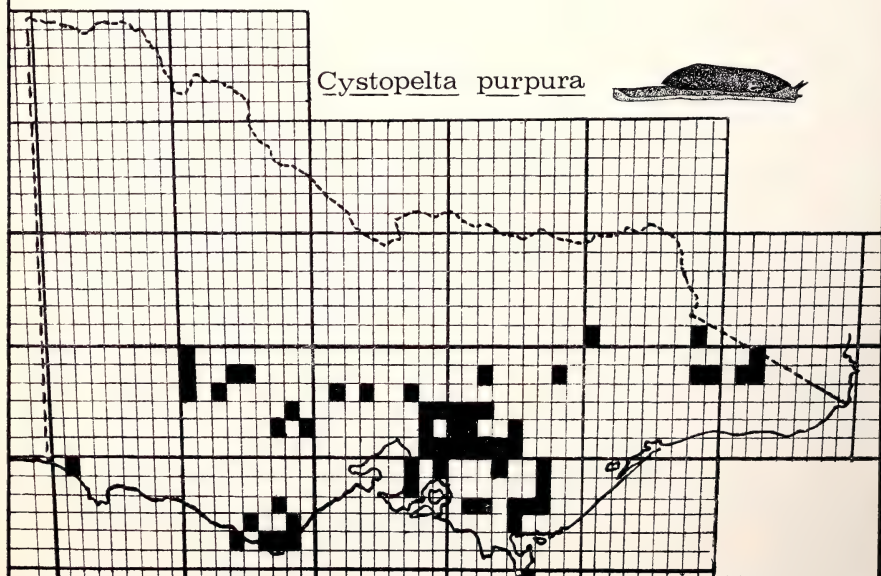


Fig. 5.



Victaphanta atramentaria-■

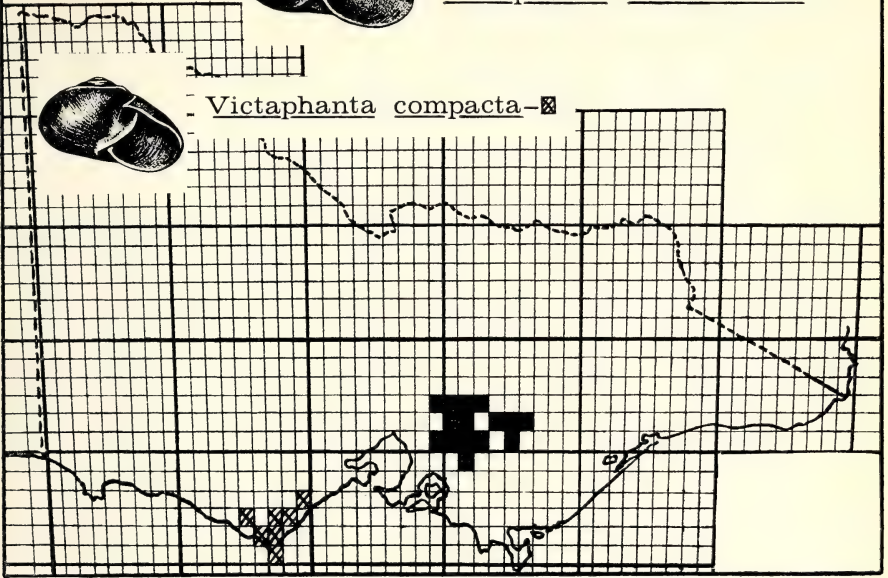
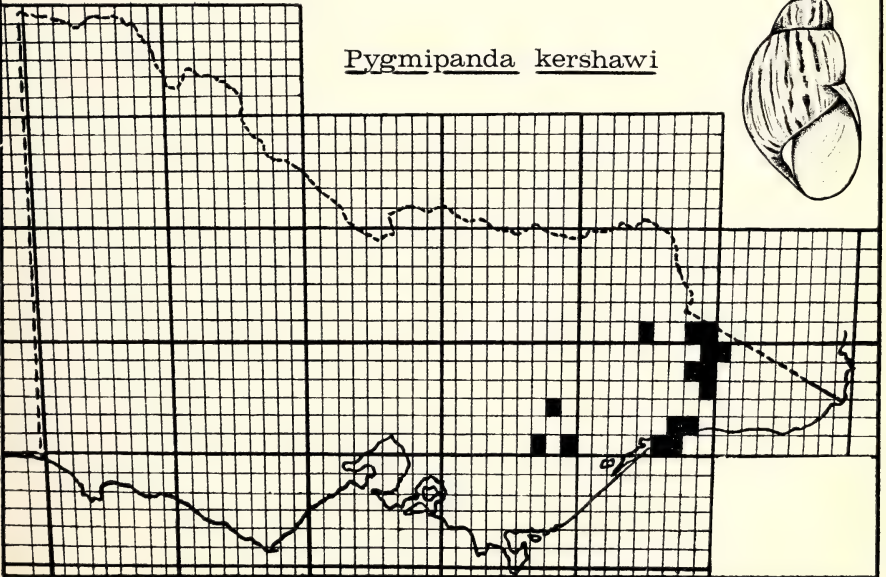


Fig. 6.

Pygmipanda kershawi



Geoplana varigata Fletcher and Hamilton

1887-

A new Land Planarian record for Victoria

by LEIGH WINSOR*

Field work on the Wellington Plains, Gippsland, Victoria, as part of a study of Victorian Land Planarians, resulted in the collection of five species of land planarians (Phylum-Platyhelminthes). One of these species was later identified as *Geoplana varigata*, Fletcher and Hamilton, previously only recorded from New South Wales and Tasmania. This therefore constitutes a new record of the species for Victoria.

Geoplana varigata,

Fletcher and Hamilton, 1887.

Fletcher, J. J., and Hamilton, A. C., 1887. *Proc. Linn. Soc., N.S.W.* 2: 364-365, pl. v. figs. 3, 3'.

Geoplana varigata, Dendy A., 1893. *Proc. Roy. Soc. Vict.* 6: 183.

Geoplana varigata, Dendy, A., 1893. *Rep. Australas. Ass. Advmt. Sci.* 5: 421.

Geoplana varigata, Dendy A., 1894. *Proc. Linn. Soc. N.S.W.* 9: 731.

Geoplana varigata, Von Graff L., 1899. *Monog. der Turbellarien. II Tricladia Terricola*, Text and Atlas.

Diagnosis: With four dark longitudinal stripes, the lateral stripes broader than the median stripes, marginal zones mottled, dorsal ground colour yellow to green. *Geoplana varigata* was differentiated from *G. subviridis* (Moseley), the median zone in the latter broad and the paired innermost stripes lateral rather than median in position, from *G. howitti* (Dendy), in which the lateral stripes were narrower than the median stripes and from *G. bicolor* (Graff), which had six dark stripes dorsally.

The Victorian specimen had a dor-

sal median zone of blue-green ground colour 0.25 mm wide bordered on either side by faint brown-flecked paired median stripes 0.25 mm wide. External to these were 0.5 mm wide lateral zones of ground colour which merged into the marginal brown-flecked paired stripes 0.6 mm wide, the inner margins of which were well defined. These were bordered by a fine zone of ground colour continuous with the ventral surface. The dorsal stripe pattern is illustrated in Figure 1.

The anterior tip was pink and the ventral surface a blue-white colour, pale over the creeping foot. Eyes were multiple, concentrated in three rows on the anterior third of the body with a single row around the anterior tip.

The specimen measured 90 mm long and 2 mm wide when crawling, the pharyngeal aperture 62 mm from the anterior end and the genital aperture 4 mm posterior to the pharyngeal aperture. The dimensions of the worm following fixation were 30 mm long and 3 mm wide. This single specimen was lodged as a voucher specimen with the National Museum of Victoria. (Reg. No. G2275.)

Three spirit specimens of *Geoplana varigata* labelled "typical", collected by T. Steel from Bundanoon, New South Wales, in the N.M.V. collections, were also examined and compared to the Victorian specimen. The above description of the dorsal stripe pattern and the relative positions of the pharyngeal and genital apertures agreed closely with those of previous

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authors, and with the spirit specimens examined. Difficulty was encountered in the description of colour as it was a mixture of yellow and green, and comparison to faded spirit specimens was pointless. *Geoplana varigata* had been recorded from localities in the Blue Mountains, Bundanoon and Burrawang, New South Wales, and from Bedlam Heights, Tasmania.

The Victorian specimen was collected from beneath a rotting snow gum at a locality 4,900 feet A.S.L., 1.2 miles from the Moroka Road, on the Tarli Karng track via McFarlane saddle, Wellington Plains, Gippsland. *Geoplana varigata* was associated with *G. howitti*, *G. spenceri*, *G. lucasi*, *G. sanguinea* and the nemertine worm *Geonemertes australiensis*, all normally found in wet mountainous areas.

Some specimens of *G. spenceri*, normally a blue-green planarian, were collected, in which the dorsal ground colour was a clear yellow in one specimen, and in two others a yellow green. Typical specimens were also found in the same locality. This colour variation observed in *G. spenceri* may explain the similar tints in *G. varigata*, there perhaps being certain environmental factors influencing pigmentation.

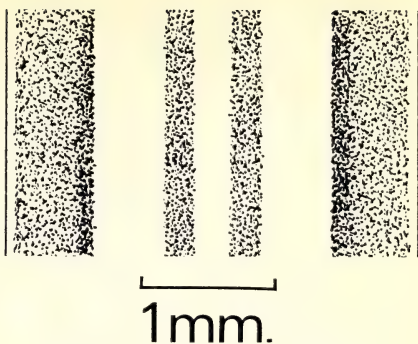


Fig. 1.—Dorsal stripe pattern of *Geoplana varigata*.

At present, Wellington Plains, Gippsland, is the only known Victorian locality of *G. varigata*, and the status of this land planarian is considered rare.

ACKNOWLEDGEMENTS

For advice and access to the collections of the National Museum of Victoria, I thank Dr. Brian Smith, Curator of Invertebrates, N.M.V., and for help in collection of specimens, I thank members of the F.N.C.V. Field Survey Group.

REFERENCE

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Corregenda

IN SEARCH OF RUDD'S ROCKS

Some small errors and omissions were inadvertently introduced into this article which appeared in the previous issue:

p. 214 — Beginning of column two should read —

22/8b From the Black Box at the start of the Line 4 should read —

23/8a As for 22/8a. On this early

p. 215 — Column one, after line eleven, insert —

23/8b Black Flat to Big Tree and return.

Column two, eighteenth line should read —

... meter. Thus details on the map are not

p. 218 — Column one, last line should read —

and with the exception of the Crested Bell-

Column two, first line should read —

bird, not difficult to note

The Field Naturalists Club of Victoria

General Meeting — 13 August

The hall was well filled with members and visitors to hear Mr. Ken Simpson speak on "Birds of the Tasman". Mr. Simpson is author of the book "Birds in Bass Strait" and has recently been studying the distribution of penguins. His talk was illustrated with a large collection of slides from different sources, both in Australia and New Zealand.

Among the exhibits at the meeting were a few small rock specimens collected by Mr. Jim Baines in a quarry near Bacchus Marsh where, last year, a number of fossilized *Diprotodon* skeletons were discovered. Mr. Simpson, who has worked with a Museum party on the site, spoke briefly about the discoveries and the problems in recovering fragile fossil material.

At the opening of the meeting the President, Mr. Peter Kelly, announced the death of Club member Miss Janet Raff; Mr. Swaby spoke of her life and work, recalling his first meeting with her when he studied at Melbourne University where Miss Raff worked for many years.

The full Treasurer's report was available, having already been dealt with by Council; Mr. McInnes drew attention to the success of the publication "Flowers and Plants of Victoria" by Cochrane, Fuhrer, Rotherham and Willis, which had been supported by the Club and from which we have received almost \$3,000 as our share of royalties. The success of this book, now completely sold out, has greatly helped the Club's finances over the past five years.

Members were concerned to hear reports of a proposal to build a chair lift between Hall's Gap and The Pinnacle, as part of extensive tourist development in the Grampians, and further information on the nature and effect of this proposed construction will be sought.

The Secretary had a display of correspondence, cuttings and notices on the board and dealt with a few matters in detail. Notice was received of a large convention to be held in 1974 organized by the Australian Forestry Council to discuss the future of the forestry and timber industries in Australia. This convention seems likely to be of particular interest to conservation groups.

The Secretary also drew attention to the establishment of a Commonwealth

Committee of Enquiry into the National Estate. The Conservation Council of Victoria, with which the Club is affiliated, is calling for information to help in the preparation of a submission to this Committee. The C.C.V. is also gathering information towards the formulation of a policy on quarrying, and is looking into problems of fire protection work by public authorities, and effects of fire protection on the environment. Any Club member who can assist in these matters may communicate directly with the C.C.V. or through a Club delegate.

Botany Group — 9 August

There was a very full programme at this month's Botany Group meeting. The main topic was "Wattles" with a large display of living and pressed specimens contributed by members; several people spoke about their exhibits. The second part of the programme was a short talk with slides of the Warambungle Range by Miss Pat Carolan. Unfortunately this was arranged at the last moment and could not be advertised in the *Naturalist*; however quite a number of those going on the spring excursion were at the meeting and enjoyed the preview of the area.

The Flower of the Month was the genus *Juncus*, the main characteristics of the sections *Thalassici* and *Genuini* were discussed with the aim of following up on Mrs. Matches comprehensive talk in May on Sedges and Rushes.

A report was received on the excursion to the Ocean Grove Nature Reserve where the group had a most enjoyable day led by Messrs. Owen Andrews and Jack Wheeler of the Committee of Management. A plant list was compiled and will be forwarded after determination of one or two puzzling species. The group was impressed with the educational potential of the reserve particularly for school groups, and the small handbook published by Geelong Field Naturalists' Club is an added asset.

There will be no excursion in August due to holiday trips by group members, but plans are in hand for a day trip to the Blackwood area on 30th September. Anyone interested in this trip who will not be attending the September meeting can obtain details from the group Secretary, Mrs. M. Corrick (tel. 857 9937).

Day Group Report

On Thursday, 16 August, the group gathered at Princes Bridge. There was a muster of 14, a very good attendance considering the wintry conditions and the absence interstate of many of our regulars.

A few paces and we were admiring the work of M.C.C. gardeners who had so well replaced all the mess and untidiness that had been made in constructing the Alexandra Road underpass. Our stroll took us through formal gardens and pleasant open park land in the Alexandra and Queen Victoria Gardens and the King's Domain. The statuary and the two pavilions were centres of interest. The sunken garden that is a memorial to the Pioneer Women of Victoria held members' attention for some time. We sought the shelter of the Myer Music Bowl for lunch. Our meeting was held there, too, despite very noisy opposition from a large but orderly school party lunching in the far corner. The floral clock in St. Kilda Road was the last garden item to be inspected.

At two o'clock we met two guides waiting for us just inside the Bell Tower entrance to St. Paul's Cathedral. Here we found much that was of absorbing interest to members. Expert craftsmanship was seen all round — in fine carving in wood and stone, stained glass, ceramic tiling and mosaics, brass, bronze and wrought iron, needlework and tapestries — all this in a beautiful interior of noble proportions. Generous use had been made of Australian blackwood while black bean was also seen as well as imported cedar and oak. Bluestone alternated with bands of sandstone in the clustered pillars. The many lovely marbles used included stone from Bega, N.S.W., Devon, Belgium and Italy. Among the granites used our Harcourt stone found a warm and useful place. Members considered this hour and a half in the quiet of the Cathedral as time well spent.

Field Survey Group

July Camp

The July camp concentrated on several areas around the perimeter of the O'Shannassy Watershed, including the Acheron Way and Big River. The thirteen members who attended collected a large number of invertebrates and lower plants despite the absence of night survey due to the cold conditions. The area provided good species of fungi, lichens, mosses, liverworts and ferns, especially *Blechnum* spp. Only two species of frogs were recorded during the weekend, due to the cold conditions; but invertebrates collected included three species of Scolopendrid centipedes, four species of native slaters, flatworms, spiders and non-marine molluscs.

August Camp

Seven members and one visitor from the "Field Nats" at Bendigo attended the camp in the Strathbogies. Despite cold conditions night surveying provided data on seven species of frogs in the area. Eight species of slaters and three Mygalomorphs were collected as well as several species of flatworms, non-marine molluscs, centipedes and millipedes. Cunningham's Skink, Striped Skink and Water Skink were also noted. In the plant world numerous species of fungi were collected, including some interesting puffballs, and five species of liverworts and one of *Anthoceros*. Of particular interest in the liverworts were two species bearing sporophytes.

July Meeting

The speaker for the evening was Mrs. Jan Watson; and her subject was "Marine Surveying". Mrs. Watson gave a fascinating insight into the work that she has been doing along various parts of the coast around Australia, as well as explaining many of the sampling and collecting techniques that she uses. The interest shown was obvious in the large number of questions that she was asked. The evening closed, as usual, with coffee and biscuits.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

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His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 8 October — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — "Symposium on the McAlister Water Shed."
(Speakers from within F.N.C.V.)

New Members —

Ordinary:

Mr. W. John Collins, 43 Kenmare St., Box Hill North, 3129.
Mr. William G. Franzke, 7 Tudor Court, Glen Waverley, 3150 (*Lepidoptera*).
Mrs. Sybil Manser, 99 Wright St., Sunshine, 3020 (*Microscopy*).
Mr. John Taylor, 33 Westgarth St., East Malvern, 3145.
Mrs. N. Mead, 23 Munro Ave., Ashburton, 3147 (*Native Plants*).

Joint:

Mr. Peter Anders and Mrs. Ruth Anders, 7 Barrington Drive, Ashwood, 3147.
Mr. James A. H. Mattiske and Mrs. Janet Mattiske, 7 Jobert Court, Blackburn South, 3130 (*Ecology, Botany*).
Mr. Ian K. Monkhouse and Miss Sandra Monkhouse, 4 Churchill Way, Kilsyth, 3137 (*Mammals, Trees and Birds*).
Mr. and Mrs. D. R. Robertson, 66 Livingstone Rd., Eltham, 3095.

Country:

Mr. Robin D. Wallis, King St., Rainbow 3424 (*Geology*).

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Thursday, 11 October — Botany Group.

Wednesday, 17 October — Microscopical Group.

Thursday, 18 October — Day Group. Latrobe University. Members going by bus to meet at bus terminal in University grounds at 11.30 a.m. Bus leaves north-east corner of Cotham and Burke Roads at 10.30 a.m. Cars meet before 11.30 a.m. at eastern car park near Glenn College. Tea, coffee and cups supplied by Latrobe.

Thursday, 25 October — F.S.G. General Meeting at 8 p.m. in Conference Room, National Museum, Victoria.

Thursday, 1 November — M.S.G. Meeting at 8 p.m. in Arthur Rylah Research Institute, 123 Brown Street, Heidelberg.

Monday, 5 November — Entomology and Marine Biology Group Meeting at 8 p.m. in the Library Conference Room at the National Museum.

Wednesday, 7 November — Geology Group.

Thursday, 8 November — Botany Group.

F.N.C.V. EXCURSIONS

Sunday, 21 October — Angahook Forest Park. The coach will leave from Batman Avenue at 9.30 a.m. Fare \$3.00 — bring two meals.

Tuesday, 6 November (Cup Day) — President's Picnic to Werribee Gorge. All members are welcome, but a special invitation is extended to the Junior Branches. The coach will leave Batman Avenue at 9 a.m. (please note time) and a stop will be made in Bacchus Marsh at 10 a.m. where members travelling by car can join the party, or if preferred can proceed direct to the picnic area on Mr. J. Myer's property which is reached through a cattle grid near the 37-mile post where a F.N.C.V. sign will be displayed. The coach fare will be \$2.50, but there will be a special junior concession price of 50 cents for juniors who are not travelling by car which should be paid to the excursion secretary, Miss M. Allender, by 21 October. Bring a picnic lunch and a snack for tea.

Wednesday, 26/12/1973-Tuesday, 1/1/1974 — Port Campbell. A coach has been chartered for this excursion which will be used for day trips to surrounding areas, probably including a visit to Tower Hill and another to the Otways, but the excursion secretary would be glad of suggestions from those knowing the area well. Motel accommodation for the members travelling by coach has been booked on a dinner, bed and breakfast basis, quoted at \$11.00 per day at time of booking. Coach fare: \$24.00.

The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

Vol. 90, No. 10

3 October, 1973

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Moloch horridus, caught south of Atula Station, Northern Territory. It
was photographed by Miss Dianna Harrison.

A Buried Soil with Fossil Gilgai within the Volcanic Deposits at Terang, Western Victoria

by

E. B. JOYCE* AND M. J. KNIGHT*†

INTRODUCTION

A section exposed during recent road work at Terang in Western Victoria has allowed a more detailed study of the ash sequence and soils. This report records the result of examination soon after the cutting was completed, as the exposure is now deteriorating.

Terang township lies 137 miles west of Melbourne on the Princes Highway, and is built on the northern rim of a wide crater known locally as "Lake Terang", although the lake which existed in the crater during the last century is now gone. A volcanic cone known as Mt. Terang lies immediately outside the north-west rim, and part of the town including the hospital is built on its slopes (Fig. 1).

The area has been described by Grayson and Mahony (1910), Walcott (1919) and Gill (1953); Ollier and Joyce (1964), and later Ollier (1967), discussed these two volcanoes when describing the Newer Volcanics of Victoria, which overall range in age from Upper Pliocene to Holocene. The Terang area is covered by the Colac 1:250,000 sheet of the Geological Survey of Victoria (1967), and maps were also provided by Grayson and Mahony (1910) and Gill (1953).

Lake Terang has the size and general appearance of the numerous maar craters with surrounding tuff rings which are found in Western Victoria in the area between Colac and Warrnambool, and Ollier and Joyce (1964) described it as a maar. Mt. Terang might at first appear to be related to the Lake Terang maar eruption, in the way that cones such as

Mt. Leura or those at Tower Hill represent the last stages of activity following the maar eruption which produced the main crater.

However, the known exposures have always suggested a more complicated picture. On the eastern flank of Mt. Terang in Seymour Street is an old quarry, now being filled in, and this shows that Mt. Terang is built of bedded yellow lapilli and ash, with a thin lava flow or flows on the flank (Table II).

The north and east rim of Lake Terang in the township area shows lapilli overlain by a lava flow or flows; this was first noted by Bonwick (1858, p. 41). The Terang Catholic Church on the south-eastern part of the rim is built on a platform of the same lava, which outcrops below the church and also further around the rim below the cemetery (see Fig. 1). The lava may include more than one flow, and in places is composed of layers about 30 cm thick.

This lava forming the rim of Lake Terang was called the "Earlier Basalt" by Grayson and Mahony (1910), and they referred to the lava on Mt. Terang as the "Later Basalt"; they also gave analyses which indicate a distinct difference in composition between the two lavas.

Above the lava on the south side of Lake Terang and east of the cemetery, Gill (1953) has described "volcanic agglomerate consisting of coarse lapilli, scoria and basalt" and present cemetery excavations are producing

*School of Geology, University of Melbourne.

(†Now at Land Utilization, D.A.S.F., Box 1863, Boroko, Port Moresby, P.N.G.)

weathered lapilli, scoria, basalt fragments and fragments of the underlying Tertiary sediments. Walcott (1919) mentioned that a well put down "on the eastward outward slope of the lake near the cemetery . . . passed through about 80 feet of tuff . . ."

The usual result of maar eruption is to produce a wide crater surrounded by a ring of "tuff", this being a general term to refer to ash, lapilli, and even scoria, blocks and bombs. The agglomerate found around Lake Terang is rather coarser than at most maars in Victoria, but similar tuff

rings are known locally. One problem is that the tuff surrounding the local maars is normally distributed in an annular ring around the crater, being highest on the downwind or eastern side. Although this is not the case at Lake Terang, the coarseness of the ejecta may offer an explanation for its more irregular distribution.

Gill (1953) described Lake Terang as a "maar-like caldera" which had been formed by subsidence following "a short and rather violent" eruption. However, it seems more probable that the crater was formed by the ejection

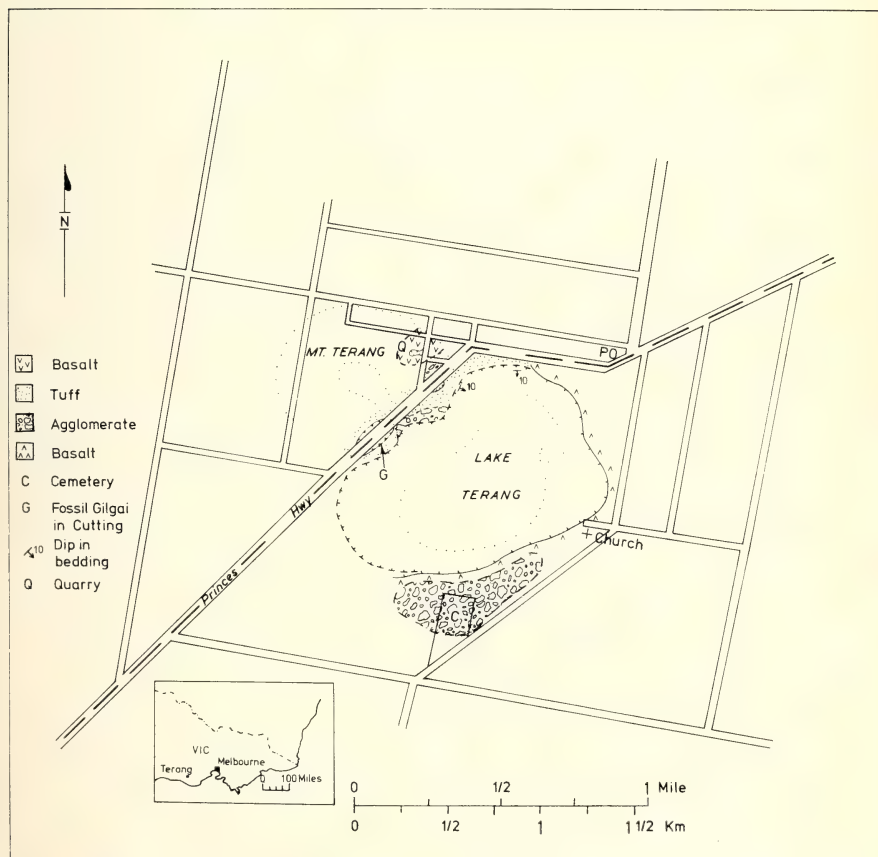


Fig. 1.—Map of Terang area showing location of road cutting with fossil gilgai.

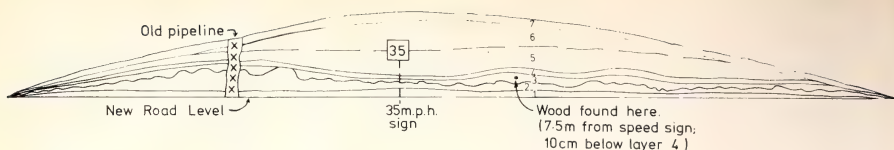


Fig. 2.—Sketch of the north-west facing cutting on the Princes Highway, one mile from Terang Post Office.

of material during a normal maar eruption which need not involve subsidence.

THE NEW ROAD CUTTING

This cutting is on the Princes Highway one mile south-west of Terang Post Office (Fig. 2). Six major depositional beds or layers can be distinguished. They are composed of volcanic ash, lapilli, and agglomerate (see Fig. 3 and Plate I). Detailed descriptions of the layers and soils are given by Knight (1971), and summarized here in Table I.

It is of interest to note that Walcott (1919) mentioned agglomerate near Mt. Terang, and this may be the material now exposed in the new road cutting.

Layers 1, 2 and 3 were laid down successively during one period of volcanic activity. Deposition then ceased, the top of layer 3 being the new ground surface. There was sufficient time for a soil over 1 m thick to form

on layers 2 and 3, which show infilled burrows, root channels and black stains on crack surfaces, similar to features which may be found on certain types of soil forming today.

Layer 2 was deposited as an ash which subsequently weathered to a swelling clay. This layer and layer 3 vary in thickness (see Plate I). The undulation of their contact is in part due to the swelling of the clay in layer 2.

After the soil had formed, vertical cracks open to the surface at the top of layer 3 may have allowed the entry of water, so that the clay of layer 2 would have swelled faster at some places than in others, resulting in the ground surface being pushed up into a series of mounds, depressions and flat areas. The pattern of microrelief formed in this way is known as "gilgai". Gilgai occurring on present day ground surfaces have been discussed by Stace et al. (1968, p. 415).

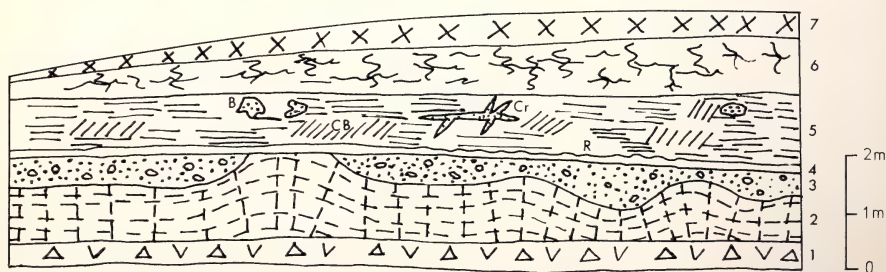


Fig. 3.—Layers exposed in road cutting. (N.B.: 7 is debris from road works; natural surface at top of 6.)

Most of the mounds were subsequently eroded, and in some places layer 3 was completely removed to expose the clay core, layer 2 (see Plate I, to left of scale). An even surface of erosion was produced, sloping south-east at 2° down the side of Mt. Terang towards Lake Terang (i.e. into the section in Plate I).

Later volcanic activity deposited the thin band of ash, layer 4, which covered the eroded gilgai, and further ash deposits followed (layers 5 and 6, Fig. 3).

Near the top of layer 5 are burrows or large root holes which have been infilled by material from layer 6. These features suggest that there may have been a break in deposition and further weathering after layer 5 was deposited and before the deposition of layer 6. However, it is possible that layer 6 was already present and as the cavities developed the material of layer 6 moved down into them. The uppermost layer is partly weathered to give a dark brown silty loam.

Charred wood fragments were collected from layer 3 and these had probably been incorporated into layer 3 during or after deposition, and before the deposition of ash layer 4. Much of the carbon was found to have been replaced by iron oxides, and the amount of carbon remaining proved insufficient for dating. Later inspection has failed to find any further wood fragments.

VOLCANIC SEQUENCE AT TERANG

The evidence from the new cutting can now be used to discuss the volcanic sequence (see Table II).

The oldest volcanic material in the area is probably the tuff or bedded lapilli which forms the lake rim on the north and east side, next to the town, where it is overlain by lava. The lapilli are up to 1 cm across, and bombs are present, as Walcott (1919)

noted, and this suggests a nearby origin for the tuff. A possible source is Pejark Marsh, 2 km to the north-east.

Both Walcott (1919) and Gill (1953) correlate this tuff with tuff found at Pejark Marsh in association with bones of extinct marsupials and an aboriginal artefact. However, they do not necessarily distinguish this tuff,

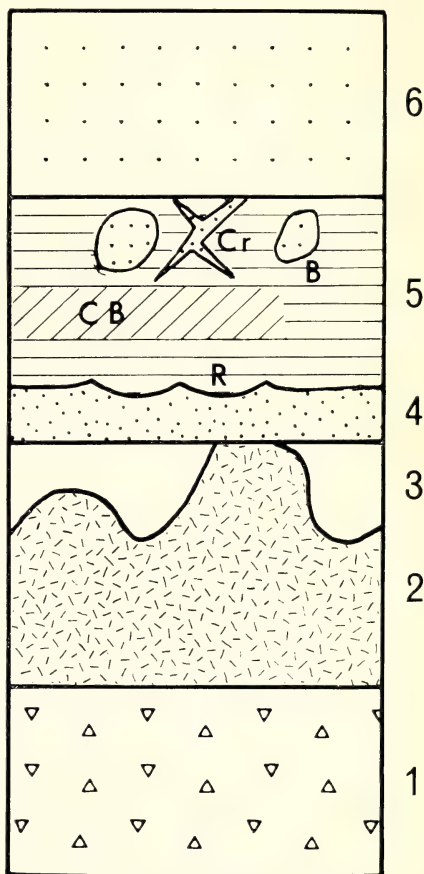


Fig. 4.—Schematic representation of the sequence in the road cutting.
(See Table I for explanation.)

overlain by the lava, from the tuff of Mt. Terang (see Table II).

The lava of the lake rim was identified by Grayson and Mahoney (1910) as the "Earlier Basalt", and this lava may have come from a vent or vents some distance away, probably to the north.

The same lava outcrops on the inner wall of Lake Terang below the cemetery, and below the Catholic Church. At the cemetery it is succeeded upslope and presumably overlain by the agglomerate which forms the high southern part of the rim. This agglomerate is correlated with that found in the lower part of the new cutting (layers 1, 2 and 3), and is interpreted as the product of a maar-type eruption which broke through the earlier layers of tuff and lava, and formed the crater now known as Lake Terang.

A long period of weathering, soil formation and gilgai development followed. Then a new period of volcanic activity commenced, building the ash cone of Mt. Terang, burying the gilgai soil developed on the agglomerate, and also producing some lava.

Gill (1953) has suggested that Lake Terang erupted comparatively recently but the evidence from the new cutting would suggest that Mt. Terang is the younger volcano at Terang, and some considerable time must have elapsed between the two periods of activity to allow the development of a gilgai soil over 1 m thick, and then its truncation by erosion.

As no evidence for renewed eruption at a point has been found elsewhere in Victoria, it seems most likely that the Mt. Terang eruption was a separate and unrelated event to the earlier Lake Terang eruption.

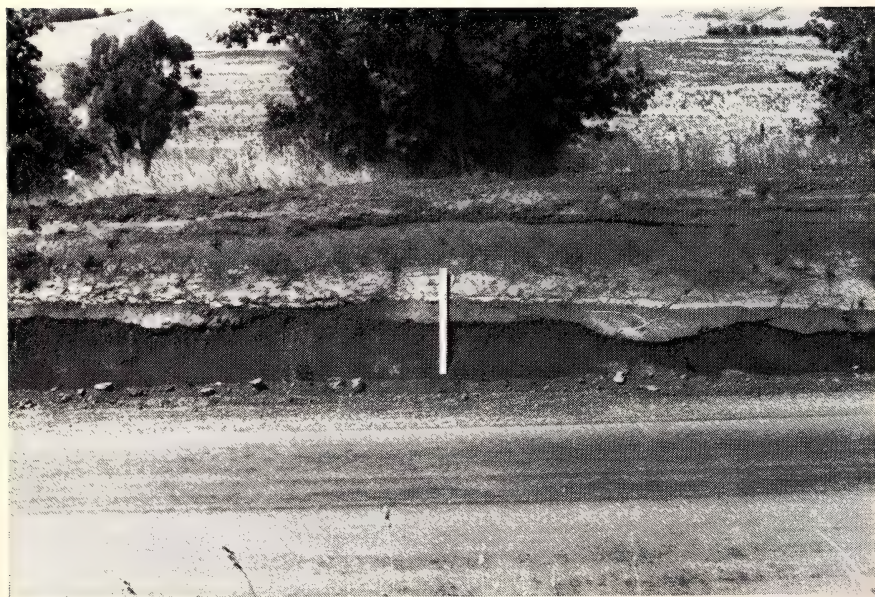


Plate I.—Road cutting on Princes Highway at Terang. Scale six foot. Looking south-east, with Lake Terang in the background (see also Fig. 3).

However, the complete volcanic history of the area around Terang still remains to be solved, and further study of the *tephrochronology* or sequence of ash layers may help to determine this.

CONCLUSION

Two separate and unrelated periods of volcanic activity have occurred at Terang. Between the two periods, suf-

ficient time elapsed for a gilgai soil to form on the earlier ejecta, become eroded and then be buried by the later ejecta.

Acknowledgement

Geomorphology students in the School of Geology assisted in the mapping of the Terang area as part of a 1970 field exercise.

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TABLE I
DESCRIPTION OF LAYERS IN ROAD CUTTING
(See Fig. 4)

Layer	Description
6.	Very dark brown ash (10 YR 2/2) weathered to a loam.
5.	Ash, olive brown (2.5 YR 4/4), well bedded, cross-bedding (C.B.), burrows or holes (B) up to 1 foot in diameter infilled with lapilli; large cracks (Cr) infilled with lapilli.
4.	Ash, greyish yellow (2.5 YR 7/2), fine cross-bedding, ripple marks (R) on the layer's upper surface.
3.	Ash, dull reddish brown (5 YR 4/4), many infilled burrows, root channels, black stains on ped surfaces, friable crumb structure, charred wood fragment. Undulatory contact with layer 2.
2.	Clay with a few weathered lapilli, very dark brown (7.5 YR 2/3), strongly cracked, a few infilled burrows, black stains and slickensides on ped surfaces. Undulatory contact with layer 3.
1.	Agglomerate containing pieces of Tertiary limestone and basalt. Deposit is mottled dull reddish brown (5 YR 4/4), and orange (7.5 YR 6/8).

SEQUENCE	QUARRY: MT. TERANG	NEW ROAD CUTTING	CEMETERY: LAKE TERANG	NORTH-EAST RIM: LAKE TERANG
	Present Surface			
F DEVELOPMENT OF PRESENT SOIL	SOIL			
E ERUPTION MT. TERANG tuff and lava	LAVA 3m	Present Surface		
	with scoria cover sharp contact			
	TUFF 8+m	SOIL TUFF 1.5m layers 4, 5, 6	Present Surface	
D PERIOD OF WEATHERING	— ? — ? — ? —	BURIED SOIL WITH GILGAI	SOIL	
C LAKE TERANG MAAR ERUPTION		AGGLOMERATE 3+m layers 1, 2, 3 — ? — ? — ? —	AGGLOMERATE 6-10m — ? — ? — ? —	Present Surface
B EARLY LAVA FLOW(S) possible source to north			LAVA 3-6m — ? — ? — ? —	SOIL LAVA 3m
A EARLY TUFF ERUPTION possible source Pejark Marsh				TUFF 3+m — ? — ? — ? — TERTIARY SEDIMENTS

TABLE II.—VOLCANIC SEQUENCE AT TERANG.

The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name

[continued from 90 (9)]

by JAMES A. BAINES

***Sieglingia.** Named by Bernhardt after Siegling. *S. decumbens* (Heath Grass) has in turn been placed in *Festuca*, *Triodia* and *Danthonia*.

Sigesbeckia. Named by L. after Johann Georg Siegesbeck (1686-1755), director of the Apothecary's Physic Garden at St. Petersburg, his bitter opponent, the plant being an insignificant weedy composite. Siegesbeck had severely criticized the sexual basis of the Linnean classification system, saying: "Never would God allow such detestable vice within the vegetable kingdom, that several men should own a communal wife, and in certain composite flowers, a husband have a mistress so near to his wife." He deplored that "such a lewd system should be taught to young students". Linnaeus sent him seeds of *S. orientalis* through Baron Bjelke, but wrote on the packet *Cuculus ingratus*, i.e. "ungrateful cuckoo", thus gaining a humorous revenge!

smithii is not a generic name, but is included because *Eugenia smithii*, the Lilly-pilly, native to East Gippsland and Wilson's Promontory, was named after Sir James Edward Smith (1759-1828), who named many plants in our flora. The genus *Smithia* in the family Papilionaceae (Fabaceae) is represented in Queensland, but its 70 species are mainly in tropical Africa and Asia. In 1784 Smith purchased Linnaeus's collections, and founded the Linnean Society four years later. The society bought the herbarium on Smith's death for £3,000. His *English Botany* (1790-1814) was illustrated by James Sowerby's 2,592 very lovely colour plates. He was M.D., F.R.S.,

was born, lived and died at Norwich; his widow was nearly 104 when she died.

Sowerbaea. Named by Smith after James Sowerby (1757-1822), F.L.S., botanical artist, who illustrated Smith's 36 volumes on the English flora (see previous entry). Three sons and a grandson were all botanists and artists. He also illustrated *Hortus Kewensis* and *English Fungi* (1797-1809) and did drawings of lichens.

Sprengelia. Named by Smith in 1794 after Kurt Polycarp Joachim Sprengel (1766-1833), a German botanist and physician, author of histories of medicine, surgery, and botany, a handbook of pathology. Johnson's *Gardener's Dictionary* states that the genus was named after C. Sprengel; if this is correct, it would be Christian Konrad Sprengel (1750-1816), uncle of the former, also a botanist, who was the first to point out (1793) the part played by insects in the fertilization of flowers. As this would be topical at the time Smith named the genus, the latter origin seems more likely than that usually given.

Stackhousia. Named by Smith in 1798 after John Stackhouse (1742-1819), F.L.S., a Cornish botanist who wrote mainly on seaweeds. He was a botanical artist, and discovered *Viola lactea*. A relative, Emily Stackhouse, depicted the mosses of Cornwall, while T. Stackhouse, who died in 1886 at the mouth of the Clarence River, was the founder and first honorary secretary of the Linnean Society of N.S.W.

(To be Continued)

Report of New Discoveries and Notes on Older Aboriginal Painted Shelters in the Victoria Range, Grampians

by ALDO MASSOLA *

In May of this year a small party¹ organized to visit two new painted shelters lately discovered by Mr. Ellis Tucker, of Brit Brit, met in the vicinity of Red Rock Creek, in the western foothills of the Victoria Range, Grampians.

Red Rock Creek arises in the fastness of the Victoria Range, and after a short, but tempestuous run through steep, rocky and broken terrain reaches the flat country about 1 km (about 0.62 miles) south of Red Rock. This is the name given to a large rockmass the face of which is devoid of vegetation and marked by prominent red scars. Although it is not really close to it, it is this rock which gives the creek its name.

This area had already yielded one painted rock shelter; it was discovered by Dr. and Mrs. J. M. Agar in March, 1966² and called Red Rock Creek Shelter No. 1. This shelter, incidentally, was visited and rephotographed on the present occasion by our party, and the observant Dr. Elder discovered an unreported design about 35 m (40 ft.) to the left of the main group described by Dr. Agar. It is a "kangaroo" track 51 mm (about 2") long, partly hidden under the yellowish fungoid growth already reported by Dr. Agar. This "kangaroo" track could be the top drawing of another group of paintings now hidden by the fungus, or could be a lone representation, these being by no means rare in the Grampians; but in either case it must not be forgotten when the final account of the Grampian paintings is drawn up.

RED ROCK CREEK No. 2

The first of the new shelters we had come to inspect is approximately 1 km (about 0.62 miles) south-east of, and on the opposite side of Red Rock Creek from No. 1. Once again, it is not, strictly speaking, a shelter, but one of those huge overhanging tors so common in the Victoria Range. It faces north, and the paintings, executed in red ochre on the rock face, are protected from direct rain by the overhang but are otherwise exposed to the weather and, consequently, are now badly faded, and it is safe to assume that many elements have disappeared altogether.

The extant paintings consist of two groups of human figures, about 4½ m (about 15 ft.) apart, the left group depicting four figures, standing, with legs widespread and the hands held high above the head. This is the accepted corroboree position, and the figures are shown wearing a dance "apron", which is clearly visible falling between the legs.

It is the disproportionate size of the hands in relation to the body, however, that impresses most, and the figures appear to be only subsidiary to them. On the first figure to the left, for instance, the length of the body from head to feet is 152 mm (about 6"), and the length of the arms held above the head is 51 mm (about 2"), but that of each hand (with fingers extended) is 176 mm (about 7"). The palms of the hands are 76 mm (3") wide. The hands are, therefore, about

*4/18 Wolseley St., Mont Albert, Vic., 3127.

life size (remembering that Aborigine's hands are smaller than the average European's), and drawn on the rock-face, not stencilled or stamped like they occur elsewhere in these ranges. This point is important, since it is believed that the stamped or stencilled hand is a "personal" mark, while the drawn hand represents that of a mythical being.

This type of large handed figure is not known from any other site in Victoria, and I cannot recall having seen it or heard of it anywhere in Australia.

The group to the right also represents dancing figures, but in these the hands are not delineated and the grouping of the figures differ from the left group. They are placed in two rows, one above the other, four in the top and five in the bottom row, but so close together that the arms and legs of each figure cross those of the figure next to it, and the legs of those in the top row cross the raised arms of those in the second row.



This treatment is obviously meant to represent a compact body of dancers, and is, in fact, the same as in the corroboree scenes painted on European paper at the close of the last century, both by Berak, the last of the Yarra River tribe³, and by Tommy Barnes, of Wahganyah, on the upper Murray River⁴. The discovery of the present painting thus shows that this style was general in Victoria and that the two above named Aborigines, though using European materials were not influenced by European art techniques, as has been suggested.

Red Rock Creek No. 2 is thus one of the most important sites so far discovered in the Victoria Range, and it is a pity that the paintings are so badly faded and that, short of restoring them, nothing can be done to prevent them eventually disappearing altogether.

Their age, of course, can only be surmised. The country (Glen Isla) was first occupied by H. N. Simson in

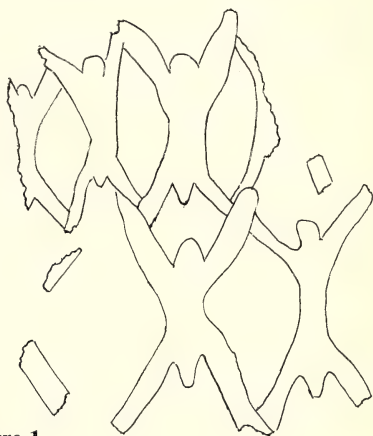


Figure 1

Left Panel:

The left-most and best preserved figure in the panel. Note the four fingers in the right hand: a not unusual trait in Aboriginal art.

Right Panel:

Detail showing the best preserved figures in the group.

June, 1843, and he had trouble with the Aborigines. Glen Isla homestead, in fact, is built in the lines of a fortified camp. At this time the Aborigines were still untouched by "civilisation" and obviously still carried out their ceremonies. The first painted shelter discovered in Victoria (now known as Glen Isla No. 1) was discovered by Samuel Carter, the then owner of Glen Isla, in or about 1859. He was on good terms with the numerous natives, who had by then been "pacified", although they most likely still held some ceremonies, but they disclaimed any knowledge of the paintings. Pleading ignorance is a good way not to give away secrets.

The distinguished anthropologist, Rev. John Mathew, visited the site and published a description of it in 1897⁵ and he then stated that although the oldest among his guides professed to having seen them "in their youth", they still could not find the paintings in a day's deliberate searching.

I take "in their youth" to mean when they were initiated, this probably being the last time ceremonies were held in the ranges, probably in the early 1860's, this date coinciding with recorded last ceremonies held elsewhere in Victoria.

If this were so we can then take it for granted that either the "guardian of the site" or the totem leaders would have come to the shelters prior to the holding of the ceremony and repainted (or made alive) the designs in readiness for the event. This procedure has been recorded from native informants elsewhere in Australia, and, with variants, must have occurred in Victoria.

Two examples will suffice to illustrate this point: Ian Crawford describes⁶ how in the Kimberleys old Aborigines "are careful to observe a certain amount of protocol when they approach the paintings". They call

out to them when several yards from the shelter "to tell them that the party is approaching and will not harm the paintings" and that "at the site the Spirit must not be upset by frivolous behaviour or, in some areas, by touching the painting. When the paintings had to be retouched the old Aboriginal (in Crawford's presence) first addressed them: "Because you are looking so dull — you're not looking bright — I'll try to draw you. I'll try and put new paint on you people . . . don't get wild . . ." and he restored the figure and "made only minor alterations, being extremely careful to follow the lines of the previous picture", and when he had finished he once again addressed the figures, "I made you very good now . . . you must be very glad . . ."

Charles Mountford describes a painting at Wimbaraku⁷, a residual of the MacDonnell Ranges in Central Australia, which "being in a shallow cave facing north and therefore unprotected from the weather has to be renovated continually. Its renovation has no ceremonial or magic function although a number of songs are chanted while the designs are being repainted." In 1951 he saw two Aboriginal men, both approaching middle age, being shown the paintings for the first time. "An old Aboriginal taking the right hand of each initiate in turn rubbed it on the rock from the tail to the head of the snake painting, then, retracing his steps, placed the hand of the initiate on each individual design explaining its mythological significance . . . This snake painting is considered by the local Aborigines to be the master of all the snakes in the desert, and they take great care not to break any of the taboos laid down by the ancient laws . . . they often perform ceremonies (at the site) because the spirit of the painting enjoyed hearing his songs being chanted."

If we take this to be an indication as to what happened in the Victoria Range, then the last time the paintings were freshened up was in Carter's time, though their origin, of course, simply goes back to the "Dreamtime".

While on the subject of the Rev. Mathew and Glen Isla No. 1, I take the opportunity to explain matters to those who have visited the shelter and are both familiar with, and critical of the rendition of the paintings published by Mathew⁸. It is a fact that although the individual figures are correctly rendered, they are far from correct in their relative position to one another.

In the shelter the paintings are spread over a large part of the rock face, and Mathew copied them on a large sheet of paper. However, in order to include them all in the one plate and yet retain a fairly large scale rendition, the then editor of the *Proceedings of the Royal Society* regrouped the figures, but omitted to state this in the caption.

This, of course, was most unfortunate, since it has caused many noted writers (the most outspoken of whom was my teacher, the late Dr. L. Adam⁹), to severely criticise Mathew.

The Reverend's original drawing has now been made available to me by his son, Dr. R. Y. Mathew, and it is here reproduced with his kind permission. Those who are familiar with the original on the rockface will vouch for its correctness, although not all the innumerable little strokes (apparently representing vegetation) are shown. In his paper Rev. Mathew frankly stated having omitted many of them, but claims that "those I have given show how thickly they are distributed and their relative length and position".

GLEN ISLA NO. 5

The second shelter we had come to inspect is a little more than 1 km (or 0.60 of a mile) south-west from Red

Rock Creek No. 2, almost exactly half-way between Red Rock Creek and Cultivation Creek and about the same distance from Glen Isla No. 1. Because the shelter is not in the watershed of either of these two creeks and it is at about an equal distance from either of them or from Glen Isla No. 1 it has been added to the Glen Isla series as No. 5; the preceding numbers being the original No. 1 with the nearby No. 2, and Nos. 3 and 4 which (in consultation with Mr. McCann and Mr. Tucker) are now allotted to the two previously unnamed sites described by me¹⁰ as occurring in the valley of a likewise unnamed little creek a short distance south of Glen Isla No. 1.

It will be understood that the placing of the several painted shelters in series is for ease of location and recording and has no bearing to possible stylistic variations or tribal or mythological grouping.

Glen Isla No. 5 is a shelter caused by the coming together of two tors. It faces south, and is about 3.75 m (about 12 ft.) high at the "entrance", about 8 m (about 26 ft.) wide, and about 7.50 m (about 24 ft.) deep, but reducing sharply both in height and width to a small hole barely large enough for a child to crawl through at the end. It is a commodious shelter to sit in (not to stand in), the floor consisting of clean and rock-free sandy loam, probably washed in by rain action.

Almost in the centre of the entrance there is a rock embedded, but loose, in the floor. It is about 140 cm (about 38") long and varying from 23 cm to 30 cm (9" to 12") in width. Because of its position in the shelter and some peculiarities in its shape (it even looks as if some rough flaking has been carried out on it in order to improve its shape) it has a vague resemblance to some nondescript animal (a lizard?)

emerging from the shelter. In this respect it can be likened to any of the free-standing, more or less oddly-shaped natural stones and rocks, said by the Aborigines to represent mythical objects or animals or ancestral Beings, met with in sacred sites all over Australia. It will be understood, however, that I am not claiming it to be one, but that I am simply recording a rock which arrested the attention of all the members of our party.

The rock walls of this shelter have been badly infested by a hard black fungoid growth which threatens to cover them entirely and which must have hidden a number of paintings. Those that are still visible were done in red ochre and are badly faded and hard to identify, the most interesting

being what look like two human figures on the right side of the entrance. One is 23 cm (about 9") high, the other 13 cm (about 5") high, and they are placed close together and look as if holding hands.

This motif of a tall and a short figure placed together occurs in other shelters in these ranges, notably Glen Isla No. 1 and Cultivation Creek Nos. 5 and 10, and obviously belong to the one mythological cycle.

In this shelter these two figures are surrounded by a number of designs now all too faded for identification with the exception of a lizard 13 cm (about 5") long and an emu track 5 cm (about 2") long, this latter situated about 90 cm (about 3 ft.) to the left of the central figures. Very faded designs



Aboriginal Rock Paintings in the Pa

Scale:

are also visible on the left side of the entrance, the only distinguishable one being an emu track about 5 cm (about 2") long.

It is unfortunate that nothing has been recorded on the religious life of the Aborigines of this region. We can only guess the totems represented by the paintings, and we know nothing about the associated mythology. All we can say is that the art of both these new shelters belongs to what we have termed "the lizard style".

NOTES AND LITERATURE CITED

- (1) The party consisted of Ellis Tucker, of Brit Brit; Ian McCann and Ian Smith, of Stawell; Dr. and Mrs. N. G. Elder and their son, James, and myself, of Melbourne.
- (2) Agar, J. M.—A new Painted Rock Shelter in the Victoria Range. *Vict. Nat.* v.83, 1966.
- (3) Massola, A.—Painting by Berak. *Vict. Nat.* 76, Feb. 1960.
- (4) Massola, A.—*The Aborigines of South-East Australia as they were*. Heinemann, Melbourne, 1971.
- (5) Mathew, J.—Notes on the Aboriginal Rock Paintings in the Victoria Range, County of Dundas. *Proc. Roy. Soc. Vic.* (n.s.) IX, 1897.
- (6) Crawford, I. M.—*The Art of the Wandjina*. Oxford Uni. Press, Melbourne, 1968.
- (7) Mountford, C. P.—*Wimbaraku and the Myth of Jurapiri*. Rigby, Adelaide, 1968.
- (8) Mathew, J. *ibid* (3).
- (9) Adam, L.—The Rock Paintings near Glen Isla, Victoria Range, Victoria. *Mankind* IV, 1952.
- (10) Massola, A.—Two New Painted Shelters at Glen Isla. *Vict. Nat.* v.76, Jan., 1960.



Billiminah, County of Dundas, Victoria.

o 1 inch.

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- (3) Massola, A.—Painting by Berak. *Vict. Nat.* 76, Feb. 1960.
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- (10) Massola, A.—Two New Painted Shelters at Glen Isla. *Vict. Nat.* v. 76, Jan., 1960.

Aboriginal Rock Paintings in the Parish of Billiminah, County of Dundas, Victoria.

Scale: 3 feet to 1 inch.

Ecological Studies on the Bennison High Plains

by

T. P. FARRELL* AND D. H. ASHTON*

The conspicuous zonation of vegetation across the shallow valley of Shaw's Creek, near Mt. Tamboritha at the southern edge of the Bennison High Plains, was studied by the senior ecology class of the Melbourne University Botany School in March 1969. These sub-alpine plains are of interest because of their relatively low altitude and annual precipitation compared with analogous areas to the North, East and West. They are also of interest because of their geographical position between the east and west Gippsland regions and because of the presence of many mature forests and woodlands. The plains have long been used for summer grazing of cattle and have been frequently, though lightly, burnt. The first cattlemen arrived about 1874 and today some 50 hectares is leased for grazing. Grazing effects are conspicuous and have been accentuated by rabbits in some areas. Wind and water erosion have occurred and many bog areas are now trampled and excessively drained (Costin, 1958). A detailed species composition analysis of this area of sub-alpine communities can be found in Chesterfield (1972).

GENERAL ENVIRONMENT

The Snowy Plains Land System (Rowe and Downes, 1960) extends for some 32 kilometres from Mt. Howitt (1715 m) to Mt. Wellington (1606 m). This sinuous land system is sharply delineated by the deep valleys of the Macalister, Wellington and Wonnangatta Rivers (Fig. 1) and consist of wooded ridges and hills separated by

broad treeless valleys. The topography is dominated by low-dipping Lower Carboniferous sandstones which are interbedded with shales and rhyolite. Many streams on the plain tend to follow the strike pattern of the rocks, which is roughly N.E.-S.W. The soils of the area have organic-rich upper horizons and may be a relatively shallow yellow brown Alpine Humus type or a deep red-brown friable Cryptopodzol type (Hallsworth, Costin and Gibbons, 1953). Rocky soils are common on the warmer slopes and are associated with outcrops of resistant sandstone. Some of the deeper grassland soils show a marked change of structure, associated with a layer of stones, at 30-40 cm. These stones are orientated with the broadest face parallel to the ground surface and suggest movement by solifluction phenomena, possibly in the last glacial period.

The annual precipitation of the south end of the plains has been estimated by Rowe and Downs (1960) to be about 1270 mm, of which a considerable proportion falls as snow. Summer rainfalls are often unreliable due to erratic thunderstorms and thus many sites are likely to suffer water stress at times. In common with other areas of high country, winds in winter can be severe and snow may be blown from exposed slopes. Shallow valleys are characteristically prone to cold air accumulation leading to periods of extreme frosting.

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VEGETATION ZONATION

The study sites chosen ranged from mature forest and woodland to lightly grazed holding paddocks on the plain (Plate 1). A species list for the study site at 1370 m altitude on the Bennison High Plains is included in Appendix 1. The vegetation was studied at the southern end of the plains across Shaw's Creek by a transect 1.5 km long with plots at 13-20 m intervals. Trees were measured in plots 30 x 10 m and all species assessed by cover classes in

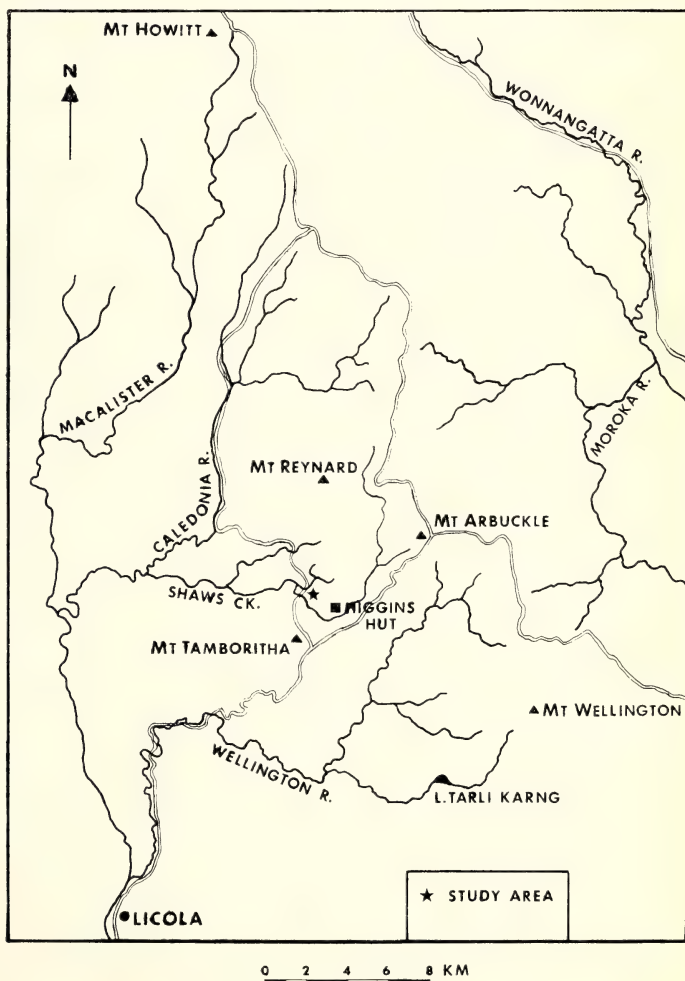
sub-plots 10 x 1 m at each site. Additional studies were made on selected sites in the treeless areas. Soil samples were taken for analysis and temperatures were measured over a period of one week.

(a) *Wooded Areas*

In general the treeless areas of the Bennison High Plains is a mosaic of grassland, herbfield, shrubland and bog bordered either abruptly or somewhat diffusely by a woodland boundary (Plate 2). This boundary consists of

Fig. 1.

The Snowy
Plains Land
System.





General view of
the Bennison
High Plains.

Photo:
E. D. Francis

a more or less continuous fringe of *Eucalyptus stellulata* (Black Sallee) followed by a broad zone of *E. pauciflora* var. *alpina* (Snow Gum) woodland. Beyond this zone an open forest of *E. rubida* (Candlebark) occurs with *E. pauciflora*. Detailed work by Chesterfield (1972) has shown that the *E. rubida* forests were in fact a mixture of intermediates between that species and *E. dalrympleana* (Mountain Gum). For convenience it will be referred to as "*E. rubida*" although on this penplain there is a tendency for *E. dalrympleana* to occupy forest sites and *E. rubida* to occupy the woodland sites. *E. delegatensis* (Alpine Ash) occurs only in the sheltered mid slopes of the east and south aspects either in pure stands or mixed with "*E. rubida*". Most of the forested areas are mature or relatively so and were only lightly burnt in a regeneration fire of 1962. On the higher ridges pure *E. pauciflora* reappears with a grassy or shrubby floor. This inversion of the treeline and eucalypt zonation has also been described by Costin for the Monaro area (Costin,

1954). The undergrowth of the montane forest of *E. delegatensis* and "*E. rubida*" is chiefly coarse tussock grass (*Poa ensiformis*), *Dianella tasmanica* and occasional shield fern (*Polystichum proliferum*). Hickory wattle (*Acacia obliquinervia*) is scattered, and regeneration of the eucalypts is occurring in gaps following ground fires of 1962. The grassy forest of "*E. rubida*" and *E. pauciflora* contains scattered shrubs of *Leucopogon macraei* and *L. hookeri*, and many herbs such as *Viola*, *Hydrocotyle*, *Asperula*, *Ranunculus*, *Geranium* and *Wahlenbergia*.

In the woodlands further down the slope fine snow grass (*Poa 'australis'*) is abundant and is associated with plains herbs such as *Helichrysum acuminatum*, and shrubs such as *Hovea longifolia* and *Grevillea australis*. In open places in this woodland, regeneration of the eucalypts has occurred without the intervention of fire. In the lowest woodland of Black Sallee many of the grassland species are present and occasional shrubs of *Hakea microcarpa* mix with *Hovea longifolia*

and *Leucopogon suaveolens*. The woodlands of Black Sallee may stop abruptly or extend as low open woodland for six or more metres. There is thus a gradual transition of species from the forest to the grassy plains, this being most conspicuous in the lower woodlands of Snow Gum. The mature tree heights tend to reflect the quality of growing conditions which are governed by moisture, nutrient

supply and temperature of the air and soil. Thus the woodlands on the ridge are 18-25 m high, whilst the tall open forests of *E. delegatensis* are 40-45 m high, and those of "*E. rubida*" and *E. pauciflora* are 30-35 m. The woodlands of these latter species lower down the slope are 15-25 m high, whilst those of *E. stellulata* in the coldest sites on the slope are only 10-18 m high. It is likely that height

Plate 2

Vegetation
Zonation across
Shaw's Creek.

Photo:
E. D. Francis



growth of the tree species may itself be a factor contributing to the zonation. Thus any "*E. rubida*" in the *E. delegatensis* stand tends to be overtopped and suppressed, and any *E. stellulata* in the "*E. rubida*" stand shows a similar relationship.

Temperatures taken during the first week of March 1969 showed that the valley is in fact a severe frost hollow as grass minima of -10°C . were recorded in the open. However, in the forest and woodland only mild frosts were recorded (Fig. 2). No doubt under extreme conditions severe frosts would also extend upslope.

A preliminary frost experiment was carried out on hardened seedlings in a cold room at -8°C . This resulted in a complete kill of both "*E. rubida*" and *E. delegatensis* and moderate to severe damage to *E. pauciflora* seedlings. The resistance of juvenile foliage to water infiltration for 17 hours under chilling conditions (2°C .) was carried out on the four species of eucalypts, since Grose (1960) had shown that this was a discriminating factor associated with survival of seedlings under a prolonged cover of melting snow. The results showed that "*E. rubida*" and *E. stellulata* were quite resistant and *E. delegatensis* very susceptible (Table 1). The clear differentiation between *E. pauciflora* and *E. delegatensis* was similar to that found by Grose.

These experiments, together with general observations, suggest that the zonation of species is due in part to differential resistance to frost and snow cover. The greater moisture storage of the deeper soils of the mid-slope on sheltered aspects probably allows *E. delegatensis* to out-compete the adjacent tree species, due to its faster growth rate, greater potential height and denser crown. The reappearance of *E. pauciflora* on higher slopes could be due to the more severe

climate — higher winds and cooler temperatures — as well as drier, shallower soils. If *E. stellulata* is more frost resistant than *E. pauciflora* at the treeline on the lower level high plains, then it is difficult to explain its absence at the upper level treeline at 2,000 metres. Mr. H. Bond (pers. comm.) suggested that this anomaly may be explained if *E. stellulata* had a higher day temperature requirement for growth than *E. pauciflora*. The relative resistance of the two species to wind and waterlogging may also be different. There is obviously a need for research into this problem under controlled environmental conditions.

(b) *The treeless plains* (Plate 3)

The species composition of the treeless areas varies according to the local topography and the depth of the soil. On the shallowest soils, belts of *Hakea* and *Grevillea* shrublands are found along the strike of the resistant rock outcrops. The *Hakea* stands are usually open with areas of grass tussocks and herbs, but may be associated with dense spreading shrubs of *Grevillea* and *Hovea*.

Mature *Hakea* forms a very large lignotuber (15-23 cm in diameter) with a strong tap root. When the mature shoots die they are replaced by new juvenile branches from ground level. Sometimes two morphologically distinct generations may be present at the one time. Seedlings are rare and establishment appears to be difficult. This disadvantage is probably offset by the relatively greater longevity of the plants. *Grevillea* and *Hovea* on the other hand regenerate without fire on rocky soils where grass is not vigorous. These communities may be patchy since maturation and death of shrubs is not always followed by an establishment of seedlings. In deeper soils where grass is vigorous the regeneration of shrubs may be inhibited by

competition in the same way as described by Carr (1962) for the Bogong High Plains.

Herbfields of *Helipterum anthe-*

moides are found on gentle rises where low-lying sandstone occurs at less than 30 cm depth and in sites where snow drifts are certain to occur in winter,

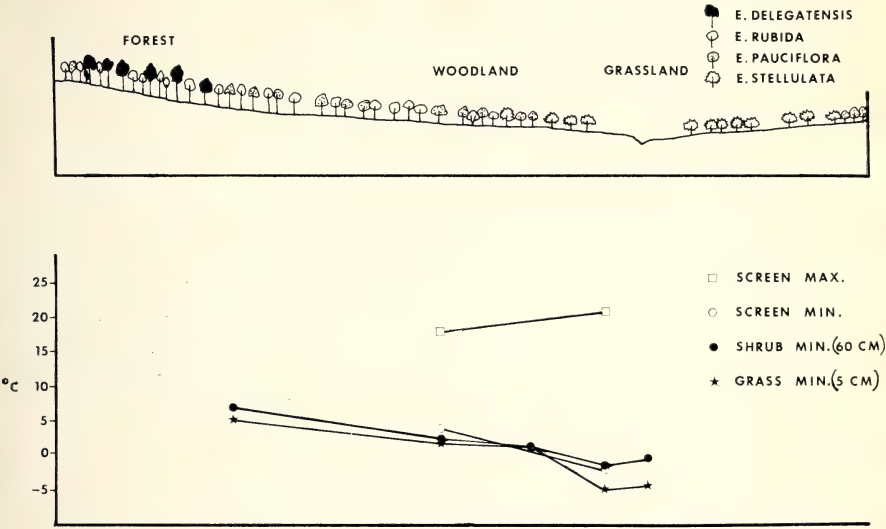


Fig. 2.—Vegetation and Temperature profiles along major transect line.

TABLE 1
INFILTRATION OF EUCALYPTUS LEAVES UNDER CHILLING CONDITIONS

Species	<i>E. rubida</i>	<i>E. stellulata</i>	<i>E. pauciflora</i>			<i>E. delegatensis</i>			
Age	Medium	Medium	Large	Medium	Small	Small	Medium	Inter-mediate	Medium
Class	Coppice	Coppice	Coppice	Coppice	Coppice	Seed-ling	Seed-ling	Seed-ling	Coppice
Mean Damage	1.4	4.4	20.8	10.8	14.0	16.0	18.2	45.2	32.6
Mean Damage for Species	1.4	4.4	15.2			28.0			

All Figures Represent Percentage of Leaf Area Damaged.

such as the eastern aspects of gentle hollows and the eastern edge of woodland boundaries. Other composites such as *Helichrysum acuminatum*, *Leptorhynchus squamatus*, *Craspedia glauca* and *Brachycome aculeata* are common associates. It appears that these sites are unfavourable for the full development of *Poa 'australis'* (fine sp.) and that under these conditions the dicotyledonous species can dominate.

In the herbfield area on shallow soil over flat sandstone *Poa* was present as either old degenerating tussocks or very young plants. The absence of one whole broad age class of the grass could have been due to a number of factors such as drought, excessive water-logging or to the activities of insects such as casemoths (Carr and Turner, 1959). It is quite possible that some of the herbfield areas are stable, but others appear to be alternating with areas of grassland, depending on the hazards of the environment.

The status of *E. stellulata* on the more or less treeless plains is interesting. It occurs sporadically both as

small bushes amongst *Hakea* and *Grevillea* heath on the rocky rises and strike ridges, and as bushes and small trees along the entrenched sections of Shaw's Creek at the southern edge of the plain. On one rocky knoll 6 m above Shaw's Creek, *E. stellulata* has been reduced to a shrub with numerous juvenile shoots only 30-60 m high (Fig. 3). The large lignotubers which support these shoots show at least 20 growth rings (Plate 4). It was deduced that the persistent juvenile condition was due to recurrent frosting of each summer's growth. In April 1972 early autumn frosts of great severity had in fact killed back all shoots of the eucalypt as well as many of those of *Grevillea*, *Hovea* and *Leucopogon hookeri*.

It is thought that this small unique area (0.1 ha) of eucalypt heath had arisen following efficient dispersal from the nearest fruiting trees 200 metres away. It is likely that this naturally open habitat provided the initial seed-bed and that the subsequent seasons were of sufficient mildness to enable establishment to the

Plate 3



The Treeless Plains.

Photo:
E. D. Francis



Stunted
E. stellulata
bush.

Photo:
E. D. Francis

lignotuber stage. Limited temperature records in March 1969 suggest that the rocky knoll is likely to be less frost prone than the surrounding plain (Fig. 4) and that local air drainage is critical. In slightly more favourable sites, bushes with adult foliage occur but bear no buds or fruits, even though similar sized plants bear them on the woodland margin. Along the entrenched section of Shaw's Creek, where the presence of a broad flowing creek and better air drainage has per-

mitted small trees to develop in a better microclimate, buds may be produced but fruits only set where the shoots have been raised well above (6-8 m) the lethal cold air layers. Flower buds had been killed below this height in autumn 1972, probably by the severe frosts of that period.

It seems therefore that there is a tendency for *E. stellulata* to invade some grassland and heathland areas of the plains and to show considerable resistance to frost, drought and water-

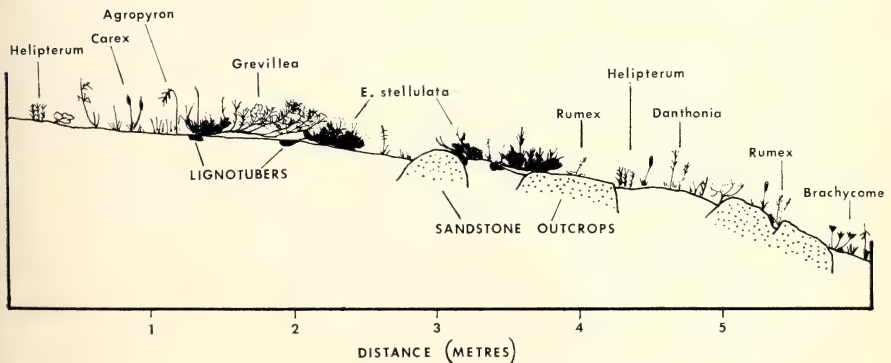
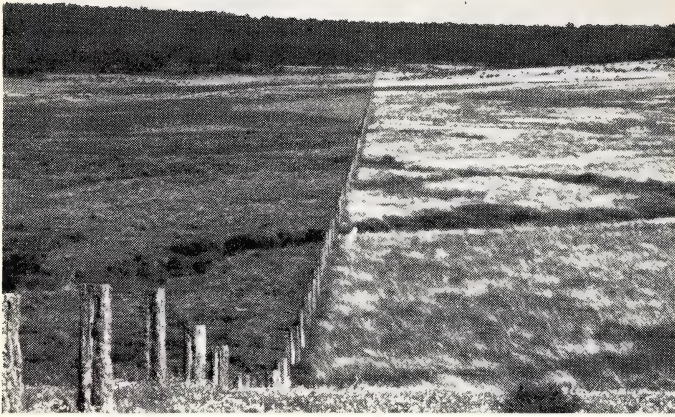


Fig. 3.—Vegetation profile, Rocky Knoll, near Shaw's Creek.



View along
fenceline of
holding
paddock.

Photo:
E. D. Francis

logging. The success of this invasion could depend on the oscillation of unusually mild and unusually severe years, although if sufficient trees establish and produce a woodland canopy this could materially affect the micro-

climate and render the change relatively permanent. If such trees grew tall enough to bear fertile seed the change could proceed at an accelerated rate.

The effects of prolonged grazing on

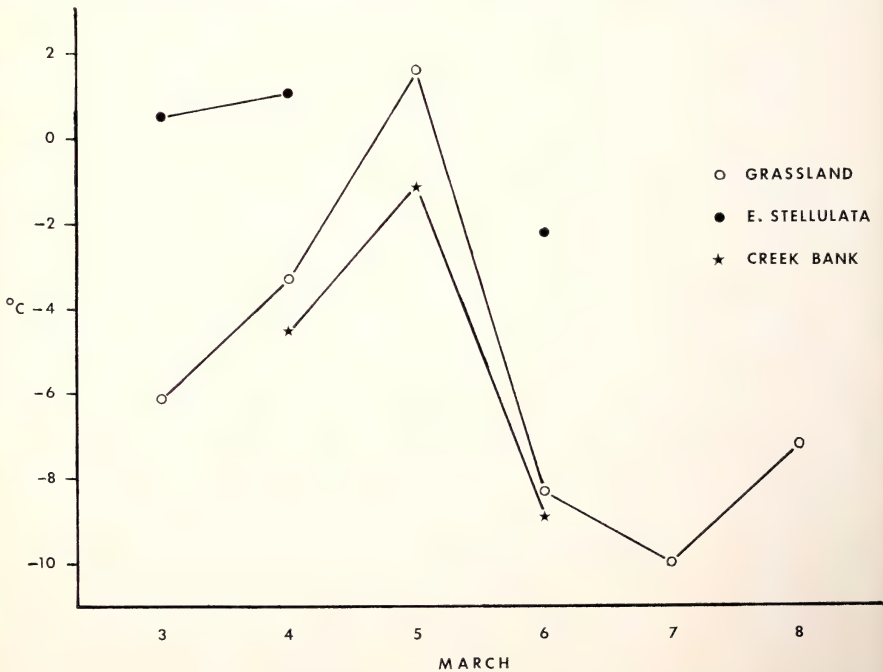


Fig. 4.—Grass Temperatures recorded in various communities.

the grassland were also quite noticeable, especially along the fencelines of holding paddocks (Plate 5). The ungrazed areas consisted of tall tussock grassland, dominated by coarse and fine blue-leaved *Poa* 'australis' and *Carex* spp. The grazed paddocks showed a greatly reduced dominance of *Poa*, while other species such as *Danthonia* spp., *Dichondra repens* and *Craspedia glauca* were absent. Only a few species were restricted to the grazed paddock. Percentage covers of species from grazed and ungrazed paddocks are given in Appendix 2. The major effect of grazing seemed to be simply a reduction in the cover of *Poa* and no major alteration in the total floristics of the area was apparent.

The vegetation of the gullies and swamps of the plains varies considerably. On the section of Shaw's Creek which cuts through the sandstone strata near the southern edge of the plain, there is a strip of wet heath dominated by *Richea continentis*, *Baeckea gunniana* and *Epacris petrophila*. A dense herbaceous stratum of *Calorophus lateriflorus* occurs beneath this, associated with *Craspedia glauca* and *Gentianella diemensis*. The soil is wet, humus rich and gravelly and is of low pH and low conc. HCl extractable phosphorus compared with the relatively uniform soils of the grasslands and forests. The swampy fens and marshes, formed on sediments which have accumulated upstream from rockbars, consist of sedgeland of *Carex gaudichaudiana* and tall grassland of *Poa australis* and *Festuca asperula* with scattered bushes of *Epacris petrophila*. Occasional hummocks of *Sphagnum cristatum* are found where tributary streams join Shaw's Creek. It is possible that *Sphagnum* is invading the marshes from bogs in the tributary gullies. These leech-ridden bogs consist of a narrow strip of peat hummocks 30-60 cm high interspersed with gravel and mud-filled hollows

colonized by *Carex gaudichaudiana*. Some tributaries have been filled with peat to the level of the adjacent slopes. The streams find a path through the series of hollows along a course made tortuous by the constant invasion of the pools by *Sphagnum* mounds. To what extent the *Sphagnum* has permitted a lateral spread of peat over the grassland at the edges was not investigated. Vegetative shoots and seedlings of *Epacris paludosa*, *Richea continentis* and *Calorophus lateriflorus* invade close behind the advancing *Sphagnum*. Sometimes mounds of *Sphagnum* are relatively pure but mostly they are supported by the shoots of the bog-heath shrubs. Only when these become very dense does the *Sphagnum* disappear, but evidence for its role in the build-up of peat can be found below the surface of the hummock. In only one case was clear evidence available for the replacement of a hummock by a pool filled with *Carex* and in this case the cycle of regeneration was similar to that described for the Kosciusko region by Costin (1954). The pH's of both the hummock and hollow peats on the Bennison Plains however were quite acid and varied little (4.8-5.6), whilst those at Kosciusko were higher and differed by almost three units (4-7) (Table 2). It is possible that the constant flushing of the pool hollows by the melt-swollen streams, especially in Spring, could prevent a build-up of nutrients and a rise of pH in the Bennison sites.

An interesting and rare pocket of fruiting *Sphagnum cristatum* was found by Mr. N. Edquist near Higgins Hut. It is possible that this small patch, around a clump of *Epacris*, could have been subject to rather longer periods of snow lie than other areas but as yet the casual factors have not been studied. It may well prove to be a genetically different race.

TABLE 2
COMPARISON OF pH VALUES OF
DIFFERENT BOGS

	Hum- mock	Hollow
BENNISON HIGH PLAINS	4.8	5.1
	5.4	5.2
	5.0	5.3
	5.6	5.6
KOSCIUSKO	5.0	6.7
(Adapted from	4.5	6.8
Costin, 1954)	4.3	6.8
	4.2	6.7
	4.6	

ACKNOWLEDGEMENTS

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D. Cooke, D. Corcoran, T. Farrell, W. Findlay, M. Foley, J. Fox, D. Francis, K. Harber, S. Hawe, J. Ireland, G. Kulbys, R. Leuning, P. Lewis, G. MacRaid, C. MacDonald, G. Morris, A. O'Halloran, R. Richards, P. Smith, P. Taylor, M. A. Thrum, J. Tippet, D. Tucker, J. Weste, H. Bond, C. Curry, I. Hemphill, I. Leversha, R. McHugh, R. McKimm, T. Rouse, I. Severe, I. Wild, R. Youl.

Appendix 1

SPECIES LIST — BENNISON HIGH PLAINS

FERNS

Polystichum proliferum

MONOCOTYLEDONS

Cyperaceae

Carex appressa

C. blakei

C. breviculmis

C. gaudichaudiana

C. raleighii

Carpha nivicola

Schoenus calypttratus

Scirpus crassiusculus

S. subtilissimus

Cramineae

Agropyron scabrum

Agrostis avenacea

Aira caryophylla

A. praecox

Danthonia laevis

D. nudiflora

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- D. penicillata*
D. pilosa
D. racemosa
Deyeuxia brachyathera
D. carinata
D. densa
D. monticola
Dichelachne crinita
D. sciurea
Festuca asperula
Holcus lanatus
Microlaena stipoides
Poa "australis" (agg.)
Vulpia bromoides
Juncaceae
Juncus australis
J. bufonius
J. polyanthemus
Luzula campestris
Liliaceae
Arthropodium milleflorum
Dianella tasmanica
Lomandra filiformis
Orchidaceae
Chiloglottis gunnii
Eriochilus cucullatus
Prasophyllum suttonii
Pterostylis curta
P. decurva
Restionaceae
Calorophus lateriflorus
DICOTYLEDONS
Araliaceae
Tieghemopanax sambucifolius
Campanulaceae
Pratia sp.
Wahlenbergia gloriosa
Caryophyllaceae
Cerastium glomeratum
Scleranthus biflorus
Stellaria multiflora
S. pungens
Compositae
Brachycome aculeata
B. scapigera
Celmisia asteliifolia
Cirsium lanceolatum
Cotula filicula
Craspedia glauca
Gnaphalium collinum
G. japonicum
Helichrysum acuminatum
H. hookeri
H. millani
H. rutidolepis
Helipterum albicans
H. anthemoides
Lagenophora stipitata
Leptorhynchus squamatus
Microseris scapigera
Olearia megalophylla
O. myrsinoides
O. phlogopappa
O. subrepanda
Podolepis jaceoides
Rutidosia leptorhynchoides
Senecio lautus
Taraxacum officinale
Convolvulaceae
Dichondra repens
Crassulaceae
Crassula sieberana
Epacridaceae
Epacris paludosa
E. petrophila
Leucopogon hookeri
L. macraei
L. montanus
Richea continentis
Euphorbiaceae
Poranthera microphylla
Gentianaceae
Gentianella diemensis
Geraniaceae
Geranium solanderi
Goodeniaceae
Goodenia hederacea
Haloragaceae
Haloragis tetragyna
Myriophyllum propinquum
Labiatae
Ajuga australis
Linaceae
Linum marginale
Mimosaceae
Acacia dealbata
A. obliquinervia
Myrtaceae
Baeckea gunniana
Eucalyptus dalrympleana
E. delegatensis
E. pauciflora var. *alpina*
E. rubida
E. stellulata
Kunzea muelleri
Leptospermum grandifolium
Onagraceae
Epilobium gunnianum
Oxalidaceae
Oxalis corniculata
Papilionaceae
Bossiaea foliosa
Daviesia ulicifolia
Hovea longifolia
Glycine clandestina
Medicago polymorpha
Pultenaea fasciculata
Trifolium arvense
T. dubium
T. repens
Plantaginaceae
Plantago major
P. varia

Polygonaceae
Rumex acetosella
R. brownii
 Portulacaceae
Montia australasica
 Primulaceae
Anagallis arvensis
 Proteaceae
Hakea microcarpa
Grevillea australis
 Ranunculaceae
Clematis aristata
Ranunculus lappaceus
R. pimpinellifolius
R. rivularis
 Rosaceae
Acaena anserinifolia
A. ovina
Aphanes arvensis
 Rubiaceae
Asperula gunnii
Coprosma quadrifida
C. repens
Galium umbrosum

Rutaceae
Asterolasia trymalioides
 Scrophulariaceae
Euphrasia scabra
Veronica agrestis
V. derwentia
V. gracilis
 Stackhousiaceae
Stackhousia monogyna
 Stylidiaceae
Stylidium graminifolium
 Thymelaeaceae
Pimelea alpina
P. ligustrina
 Umbelliferae
Hydrocotyle hirta
Oreomyrrhis eriopoda
O. argentea
 Violaceae
Hymenanthera dentata
Viola betonicifolia
V. hederacea

Appendix 2

EFFECTS OF GRAZING ON GRASSLAND. BRAUN BLANQUET VALUES FOR INDIVIDUAL QUADRATS, EACH ONE METRE SQUARE.

Absence of a value indicates that the species was not recorded in that quadrat.

Species	Ungrazed (6 Quadrats)						Grazed (4 Quadrats)			
<i>Poa 'australis'</i>	3	4	5	5	4	2	3	2	2	
<i>Carex</i> spp.	1	2	1	3	2		+	2	+	1
<i>Ranunculus rivularis</i>	1	2	1	1	1		1	+		
<i>Trifolium repens</i>	2	+	2	1	+		1	3	+	+
<i>Danthonia</i> spp.	1	2	+							
<i>Oreomyrrhis</i> spp.	2	+	+	+			+	1	+	
<i>Epacris petrophila</i>	2	3					2			
<i>Cotula filicula</i>	2	2					1	+		
<i>Craspedia glauca</i>	1	2								
<i>Dichondra repens</i>	2									
<i>Linum marginale</i>	2									
<i>Luzula campestris</i>	1						+	+		
<i>Brachycome</i> spp.	1						+			
<i>Gnaphalium japonicum</i>	1						+			
<i>Deyeuxia monticola</i>	+									
<i>Viola betonicifolia</i>	+									
<i>Hydrocotyle hirta</i>	+						+			
<i>Lagenophora stipitata</i>	+						1	+		
<i>Acaena</i> spp.	+						+	1	+	
<i>Geranium solanderi</i>	+						1	1	+	1
<i>Leptorhynchus squamatus</i>							+	1		
<i>Calorophus lateriflorus</i>							+	1		
<i>Scleranthus biflorus</i>							+	1		
<i>Galium umbrosum</i>							+	+		
<i>Cerastium glomeratum</i>							+			
<i>Stellaria pungens</i>							+			
<i>Plantago varia</i>							+			
<i>Agropyron scabrum</i>							+			

Field Naturalists Club of Victoria

Botany Group

13 September.

The speaker at the September meeting was Mr. Tom Sault and his subject was "Some Plant Associations of the Mornington Peninsula". Mr. Sault has made a special study of this area, and is well versed in its many aspects, as well as having a very thorough knowledge of the plant communities. In spite of fairly intensive agriculture and the spread of suburbia there are still some unspoilt areas left, including one or two fern gullies. Some of the showiest plants are found on the heathlands and these are rapidly being taken over for housing. Mr. Sault commented that few owners and builders of new houses seemed to be aware of the potential for an attractive garden which would result from the preservation of the native vegetation on their block, and it was still common to see housing land completely levelled by bulldozing before building commenced.

The Flower of the Month was the genus *Dillwynia*, illustrated by pressed specimens of several species. Also exhibited were several of the pea family, both native and introduced, as examples of some of the different tribes of the family.

Mr. Alan Morrison showed and spoke on three plant specimens which he had collected in Western Queensland, including a very large flowered species of *Prostanthera* which is as yet unnamed.

Due to seasonal conditions it was decided to make the September excursion to the Rushworth State Forest, instead of to the Blackwood area as originally planned. Mr. Bruce Fuhrer will lead the group. The exceptionally wet season is reported to have produced a great wealth of flowers and plants including a great variety of annuals and ephemeral

things which appear only in favourable conditions.

The next meeting of the Group will be on 11th October, when Messrs. Kriek and O'Shaughnessy of the Melbourne & Metropolitan Board of Works will speak on "Studies and Experiments in Management of Water Catchment Areas". The November meeting topic is "The Alternation of Generations; Mosses, Ferns, etc., to Flowering Plants", by Miss Madge Lester. Members are reminded that this meeting, on Thursday, 8th November, will be on the Thursday prior to the General Meeting.

F.S.G. September Camp

Maryborough District

Seven members spent a profitable week-end in fine weather surveying in the Maryborough district.

Survey work commenced at Clunes, moving N.W. to Bung Bong then to Maryborough. A camp was established near the Bealiba Range west of Dunolly. Night survey work extended far northwards into the flood zones where valuable records of breeding for many frog species were obtained. Sunday, the group moved west to Bealiba, returning to Maryborough via Natte Yallock.

Collecting was good, the recent rain providing sufficient moisture to keep most invertebrates in easily accessible micro habitats. Many centipedes, planarians and beetles were found. Orchids and many other wildflowers were common. Of interest was the finding of the freshwater crustacean *Lepidurus* in roadside ponds.

Other members of the group travelled to the Little Desert area where they collected a scaly foot legless lizard. Several land planarians, hitherto previously never found in such dry regions, were recorded.

JUNIOR F.N.C. MEETINGS

Friday, 26 October — Hawthorn Juniors in Town Hall at 8.00 p.m.

Friday, 2 November — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 2 November — Black Rock Juniors at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Crescent and Bent Parade.

Friday, 9 November — Montmorency and District in Scout Hall, Petrie Park at

October, 1973

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Field Naturalists Club of Victoria

Established 1880

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Geology: Mr. T. SAULT.

Mammal Survey: Mr. D. KELLY, c/o 14 Finnigan's Road, Research, 3095.

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 12 November — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — Natural History Medallion Presentation to Mr. E. D. Gill; who will speak on: — “Changes in the Natural History of Victoria by Radio Activity”.

New Members —

Ordinary:

Mr. W. Derrick Bevan, 39 Chaucer Crescent, Canterbury, 3126. (*Mammals and Geology.*)

Mrs. Coralie Daniels, 17 Montgomery Ave., Mt. Waverley, 3149. (*Marine Biology.*)

Mr. David Maiden, 5 Lee Ave., Springvale North, 3171. (*Botany and Field Survey.*)

Joint:

Mr. Peter G. Shanks, Mrs. Dorothy N. Shanks, 59 Argyll Street, Chadstone, 3148. (*Botany.*)

Ordinary:

Mr. Bruce D. Tivendale, 33 Stephens St., Nth. Balwyn, 3104. (*Mammal Survey and Botany.*)

Country:

Mrs. Thelma Mann, Trafalgar Road, Thorpdale, 3835. (*Wildflowers and Birds.*)

Mr. Brian Pell, 5 Pyrors Road, Horsham, 3400. (*Botany.*)

Junior:

Stephen D. A'Beckett, 102/197 Domain Road, South Yarra, 3141. (*All Topics.*)

Denyse Gibbs, 26 Crow Street, East Burwood, 3151. (*Entomology.*)

David F. Martin, Lot 3, Adam Ave., Hallam, 3803. (*Field Survey.*)

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Thursday, 8 November — Botany Group. Miss M. Lester will speak on the “Alternation of Generations”.

Thursday, 15 November — Day Group final meeting for year. Visit to Natural Resources Conservation League, at Springvale. Catch 10.29 a.m. Dandenong train to Springvale, thence by 11.15 a.m. Grenda's coach.

Wednesday, 21 November — Microscopical Group.

Thursday, 22 November — F.S.G. Members' Night in Conference Room, National Museum at 8.00 p.m.

Monday, 3 December — Marine Biology and Entomology Group Meeting at 8 p.m. in Library Conference Room at National Museum.

Wednesday, 5 December — Geology Group.

Thursday, 6 December — Mammal Survey Group Meeting in Arthur Rylah Research Institute, 123 Brown Street, Heidelberg, at 8.00 p.m.

Thursday, 13 December — Botany Group.

F.N.C.V. EXCURSIONS

Sunday, 18 November — Murrundindi Falls. The bus will leave Batman Avenue at 9.30 a.m. Bring two meals. Fare \$2.20.

Sunday, 9 December — Cape Schanck. The bus will leave from Batman Avenue at 9.30 a.m. Fares \$2.50. Bring two meals.

Wednesday, 26/12/1973-Tuesday, 1/1/1974 — Port Campbell. A coach has been chartered for this excursion which will be used for day trips to surrounding areas, probably including a visit to Tower Hill and another to the Otways, but the excursion secretary would be glad of suggestions from those knowing the area well. Motel accommodation for the members travelling by coach has been booked on a dinner, bed and breakfast basis, quoted at \$11.00 per day at time of booking. Coach fare: \$24.00, to be paid by December General Meeting.

JUNIOR F.N.C. MEETINGS

Friday, 7 December — Preston Juniors at 281 High Street, Preston (Rechabite Hall), at 8.00 p.m.

Friday, 14 December — Montmorency and District in Scout Hall, Petrie Park at 8 p.m.

Friday, 14 December — Black Rock Juniors at 8 p.m. in Congregational Church Hall cnr. Arkaringa Crescent and Bent Parade.

Friday, 21 December — Hawthorn Juniors in Town Hall at 8.00 p.m.

The Victorian Naturalist

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Flocks of Budgerigahs coming to drink at Waterhole beside The Bitumen, north of Alice Springs. Photo: Graham Pizzey.

Radiocarbon Dating of Mount Napier Eruption, Western Victoria, Australia

by EDMUND D. GILL* and L. K. M. ELMORE.

Mount Napier is a volcanic cone in the Hamilton District of Western Victoria. This cone is part of a whole array of features—cinder cone with lava fountain spatter on the crater walls, parasitic cones, lava flow, pressure ridges, chasms, tumuli, lava caves (some with stalactites), and so on. Many writers have noted the youthful nature of this eruption centre (Skeats and James 1937, Hills 1939, Ollier 1964, Ollier and Joyce 1964), but an attempt has now been made to date it with radiocarbon.

No material suitable for C14 assay could be found in the ejectamenta (as exposed in quarries) so a sample was taken from the base of a peat bed in Buckleys Swamp, because this was formed by the volcanic products

blocking the drainage, so forming the swamp. Figure 1 shows the site from which the sample came. The depth was 1.4 m. The date obtained by radiocarbon assay was 7240 ± 140 yr B.P. (GaK—3706). As it is the age of organic material accumulated after the eruption, it is a minimal date for that event. However, as the sample came from the base of the deposit, the date is probably near that of the eruption. It approximates a date obtained for the eruption of the Tower Hill caldera near Warrnambool, viz. 7300 ± 150 yr (Gak—2856). This date was from the assay of Aboriginal midden shells (marine) in the tuff from the volcano (Gill 1972).

* National Museum of Victoria.

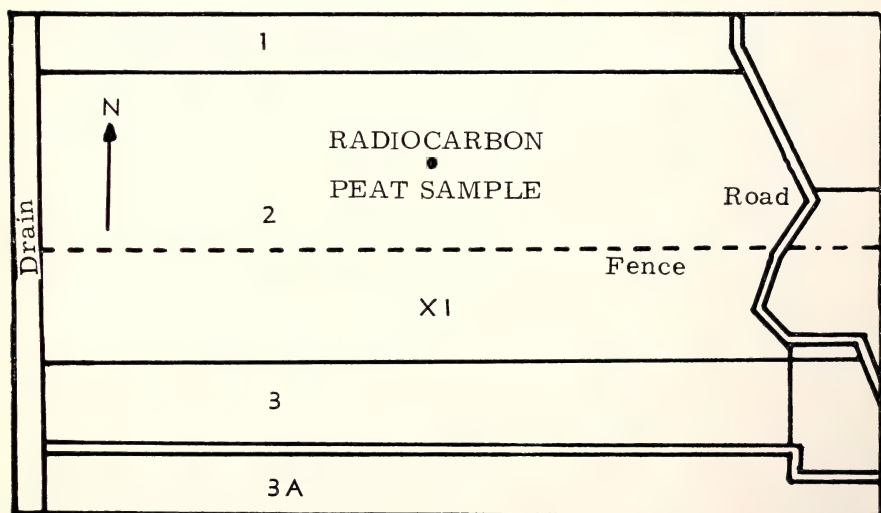


Figure 1. Radiocarbon sample site in the Parish of Yatchaw West, Western Victoria (see Fig. 2). The site is 210 m (230 yd) north of the fence shown, and 320 m (960 yd) west of the road.

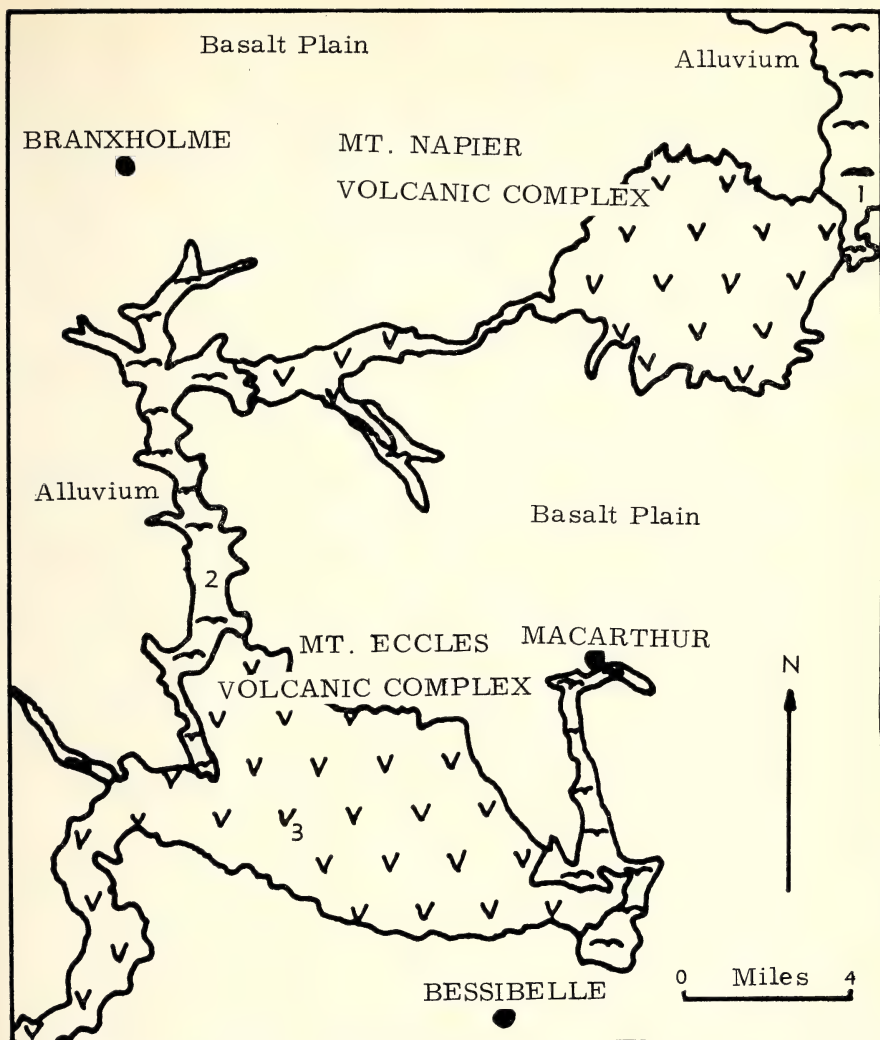


Figure 2. Mt. Napier and Mt. Eccles volcanics and associated swamplands. 1 = Radiocarbon site, Buckleys Swamp, 7240 yr B.P. 2 = Radiocarbon site, Condah Swamp, 6235 yr B.P. 3 = Diatom/phytolith site (Gill and Gibbons 1969), grid reference 823,037 Heywood Military Map 1942.

In 1969 Gill and Gibbons reported a date of 6235 ± 120 yr (GX—0150) for a basal peat in Condah Swamp that overlies a basalt flow believed to be from Mount Napier. Figure 2 shows the relationship of the two sites with respect to the volcanoes, based on the

mapping of Gibbons and Downes (1964). Two interpretations have been given for the Lake Condah deposits:

1. That they are simply accumulations of sediments over the basalt flow in an area of very low declivity.

2. That they are sediments due to ponding that followed the damming of drainage by the products of the Mount Eccles eruption.

Insufficient field work has been done to solve this problem. A third possi-

bility is that the swamp deposits are due to both processes because the Mount Napier eruption was earlier than the Mount Eccles event. It will be noted that the two radiocarbon dates differ by about 1000 years.

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Nature Notes from the Gold Coast

by ALEX. N. BURNS.

Although the July rainfall of over 12 inches constituted a record for the month of July (the normal being 2.4 inches) which is considered to be part of the "Dry Season", activity in the natural history field has been considerable. Several koalas have appeared carrying very small young ones on their backs, and the scrub turkeys are in full force; as many as 30 individuals coming to be fed in the late afternoons. Mound building is in full swing; one old mound disused for two seasons is now being re-built on a much larger scale. The work involved in mound construction is indeed considerable, and, as the terrain is very rocky with many large boulders, the scratching of the leaf debris over a

distance of up to 60 feet or more entails much energy and labour for the birds. The two mounds at present under observation are on sloping ground and the birds have the good sense to work downhill towards the mound, thus gaining a little gravitational assistance. Clearing of the leaves and rain forest debris is very thorough, the ground surface being left as clean as if swept carefully with a broom. The extent of scratching on the downhill side of mound does not extend more than about 20 feet. Egg laying should commence in September, and with the good rains and moist compost, conditions for incubation should be optimum. During the scratching operations the supply of

natural food is good, the moist compost yielding numerous small land crustaceans, worms, beetles, and many other miscellaneous creatures.

Breeding experiments with the White Nymph butterflies (*Mynes geofroyi guerini* Wall.) have proceeded very well and have yielded some interesting data. A number of batches of eggs and small larvae was collected, and placed on branches of the food-plant (Small leaved Stinging Tree, *Laportea* sp.) which last very well in water. Loose dry cotton wool was placed round the stem near the water container to prevent the larvae from "straying". Their intensely gregarious habit however almost completely prevented this. For the first three instars (periods between moults) the larvae, blackish in colour, kept in close groups on the underside of a leaf, sometimes as many as 30 individuals together. Before the next moult the larvae rested with the anal and pre-anal segments raised giving them a superficial resemblance to Sawfly larvae (Tenthredinidae-Hymenoptera). At the pre-pupal instar some individuals showed a definite brownish colour in the body spines, the majority however were black. They now congregated in a close mass on the leaf stems and twigs and looked more than ever like Sawfly larvae. The raising of the last two body segments added greatly to this resemblance. Moving from one feeding leaf to another was more or less "orderly"; one or two larvae would lead off and soon all the others were following. This procedure also was followed when the time for pupation arrived. A small branch was

selected and the larvae moved off to it and spun small silken pads quite close to one another; and to these they attached themselves by the anal segment and hung head downwards for a couple of days before actually changing into pupae. The pupa is elongate, approximately a full inch in length, dark greyish brown in colour, a golden spot on each side of the thorax dorsally, two blunt spines on either side of the head, and two longitudinal rows of three spines on each side of the abdomen dorsally. It was a surprise when it was found that the pupal stage lasted only two and a half weeks at this time of year. The larval life averaged from 6 to 7 weeks. Emergence of the butterflies usually takes place at night or in the early morning. From the first batch of sixteen pupae the first seven to emerge were females. Eventually from the total there were only five males, and all the butterflies had hatched within 24 hours. A few butterflies from the original "parent brood" are still on the wing (these worn specimens must be in some cases about 8 weeks old).

In the northern part of its distribution (Rockhampton northwards) the White Nymph sometimes exhibits a much whiter underside colouration; the writer had hoped to breed some of these but so far without result. All the specimens hatched out so far have been fine and large and with very little variation on either side of the wings.

There are still several fairly large batches of pupae to emerge so here's hoping!

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary. Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

reptiles of victoria - 10

by HANS BESTE

Plate 19

Tiliqua rugosus — Shingleback Lizard

A large lizard of the Bluetongue group.

Length: to 18 inches.

Popularly known as "Pinecone Lizard", due to overlapping scales on the upper body surface. Under smooth. Tail, short and stumpy. Legs powerful but short, with short toes. Colour variable from very light creamy with brown markings to almost completely black. Under usually creamish. Head, large and triangular. Males are more robust than females, having noticeably larger heads.

Habitat: open and forest country throughout western parts of State.

Best distinguishing features — blue tongue, shape — especially tail and scalation.

Plate 20

Physignathus lesueurii howitii — Gippsland Water Dragon

A large spinous lizard of Eastern Victoria, living always near water.

Length: to 3 feet.

Head, large and angular, with distinct ear opening (covered by tympanum). Line of triangular scales extending from top of head along spine to tip of tail. Other enlarged scales prominent on head and neck. Tail twice as long as body, compressed vertically for swimming. Limbs well developed, hind-limbs powerful, with strongly developed toes. Males, generally greyish green, when adult, with orange and blue throat markings. Females and juveniles basically yellowish-brown.

Habitat: along watercourses in Gippsland to the Thompson River in the West. More often heard than seen, as it dives into water with a loud splash, often from considerable heights.

Best distinguishing features — shape and size, habitat.



Plate 19



Plate 20

Winter Day at Kangaroo Island, South Australia

by EULALIE BREWSTER

After leaving Adelaide Airport before dawn on 14 June, 1972, in driving rain; a somewhat bumpy trip was made to Kangaroo Island with occasional brief glimpses of the ocean through broken cloud and rain squalls. Once over the Island we could see a sodden landscape with muddy streams and dams. Two or three runs were made over the airstrip before vision was good enough for the plane to land. Some time later we learnt that the guest house manager on the Island, arranging the day trip, had rung the airport to see if a plane was really braving the weather and coming over!

It was a bleak scene outside the airport — a few hardy *Eucalyptus ficifolia* near the car park, and banks of scrub visible in the mist-shrouded distance.

An 18 mile bus trip followed to American River, with six passengers rattling along in an airways bus built for forty. Two of them were highly delighted with the amount of birdlife and wildflowers they saw. Birds included Plover and Ibis, a Common Myna, White-faced Herons, Swans, and Silver Gulls and Terns once we reached the coast. On this short drive we were able to recognise quite a number of flowers and shrubs already known to us — *Correa*, both red and green, (we later learnt there are five species found on the Island in a variety of colours), *Cassythe melantha* over many of the shrubs, *Banksia* — (both *marginata* and *ornata* grow in this area), Grass-trees, Wild Irishman — (two plants are known by this name), *Petrophila multisecta* and *Iso-pogon ceratophyllus*, Sheoaks, several

Acacias, Sedges, Tea-trees and Eucalypts. There were *Melaleucas* flowering, Box thorns and Boobialla, Soursob (*Oxalis cernua*), and Burrs. Some of the soils appeared to be limestone, with clays and patches of ironstone pellets on the surface.

At American River there were sandstones bordering the beach, with tea-trees framing the view across the bay. *Pittosporums* and *Acacia pycnantha* were seen. We here transferred to a smaller vehicle and were soon travelling towards Seal Bay. Along the roadsides we saw Red Correa, White Heath, Bell Heath, *Goodenia*, *Hakeas*, a *Pimelea* some three feet tall, and more Dodder.

Also seen were Parrots, two Mountain Duck, Magpies, and Kangaroos.

Sheltered among the sand dunes at Seal Bay we found quite a number of the Hair Seals for which this area is famous. Some were alone, some in pairs of a female and suckling pup; and there were family groups — a bull and his harem and their young. Of this latter group, one female was most belligerent in chasing us away, while the much larger and battle scarred bull continued dozing in the sun. The crests and sides of the dunes were well clothed with Coastal Saltbush (*Atriplex paludosa*), New Zealand Spinach (*Tetragonia tetragonoides*), and Pig-face (both the Angular and the Round Leaved), while the valleys between were bare sand where the seals sheltered. At this spot we also saw Flame Heath and a prostrate *Correa*. The wind was so wild and cold, that we did not stay long.

Our next stop was at the Kelly Hill

Caves where a variety of Eucalypts and smaller shrub growth gave shelter from the wind. There was a native pigeon sighted, Wattle Birds in the trees, and Cape Barren Geese in a nearby paddock. In the course of the walk to the cave entrance we found Native Aster (*Olearia rudis*), *Clematis mycophylla*, *Dianella revoluta*, *Hardenbergia violacea*, *Thomasia petalocalyx* a *Baeckia* and Bracken. Although not extensive, the caves were attractive with their varied formations.

From the caves we went on to the Flinders Chase Fauna and Flora Reserve. In the cleared areas there were dozens of Kangaroos, Emus, and Cape Barren Geese feeding together in their own groups. The road led on through thick bush to our first stop in the Chase at Cape de Couedic, where from the base of the lighthouse we could look out across the Casuarina Islets (or The Brothers), two low islands with sparse flattened growth on their surfaces. From the lighthouse a painted trail led over the pitted limestone to the extremity of the cape where we climbed down the cliff and along its side to look through the spectacular Admiral's Arch. Blackened stalactites hung from its roof forming an impressive frame to the wild seas breaking against the cliffs to the west. The three distinct types of rock in the formation were easily seen — limestone above, softer eroding sandstone which had worn away to form the arch, and a darker harder base rock. From here we could look east around the cliffs to the Remarkable Rocks. These are a collection of huge granite boulders eroded into fantastic shapes as they sit atop a huge dome-shaped mound of granite. When we reached

them we were warned not to venture on the seaward side of the rocks for fear the wind plucked us from our footholds and flung us into the sea below. Our next stop was at a more sheltered place at Rocky River, where we saw Koalas, and fed the bread and butter left from our lunch to the Kangaroos. Many of them appeared to be females with young in their pouches, but not a joey did we see.

The route back to American River took us along the West End Highway which divides Flinders Chase from farming land, and then along the Playford Highway roughly across the centre of the Island. Although none of the Island is over 1,000 feet above sea level, this road gave us views, between showers, over the valley of the Cygnet River to the north, and over farmlands to the south. Throughout the day we were impressed by the way the roadsides had not been scraped bare but had been left with attractive wild edges which also formed wind-breaks for the farms. Likewise, clearing of the farms for pasture had been done in such a way as to leave thick shelter belts of native growth along many fence lines.

While we waited for dinner at American River we took a quick walk along the windy foreshore and were rewarded by the sight of four Pelicans floating on the water, and over a dozen more wheeling overhead. These latter soon landed on the inlet and the whole formed an elegant flotilla in the fading light. The weather had been improving all day and there were broken clouds and no rain when we returned to the airport. Once airborne it was a treat to watch the plane's shadow thrown by the almost full moon as we left this fascinating island.

Needed Urgently

The Editor is in need of smaller articles to help in making up the normal content of the *Victorian Naturalist*. Surely something of interest is seen on the many excursions undertaken by members.

The Vegetation of Sloping Island, Tasmania

by J. B. KIRKPATRICK*

The islands of Bass Strait have been the subject of considerable recent botanical exploration (e.g. Whinray, 1972a, 1972b; Marginson and Murray-Smith, 1972; Kirkpatrick, Massey and Parsons, 1973). While our knowledge of the vegetation of these islands is expanding rapidly the equally interesting islands in the south of the State of Tasmania have received little attention. This article describes the vegetation of Sloping Island which is situated in Frederick Henry Bay approximately 1.5 km from the north-west extremity of the Arthur Peninsula (Figure 1).

The island is approximately 1.5 km long by 0.75 km wide and attains an altitude of 70 m above sea level. No climatic figures are available but the island probably receives between 600 and 650 mm of precipitation per annum and almost certainly enjoys relatively equable temperatures throughout the year as a result of its maritime location. The geology of the island is generally mapped as Permian mudstone in the north and Jurassic dolerite in the south. However, these rocks outcrop rarely, being overlain by recent cover sands over the greater part of the island. The underlying rocks become most evident along the coast where broad platforms are formed in the mudstone, while the dolerite plunges directly into the sea. There is a marked contrast between the exposed cliffs of the south-west coast and the more gentle shores of the other more sheltered coasts. Paradoxically the slopes of the western part of the island (excepting the cliffs) are generally gentler than those found in the east (Figure 2).

The island is held under lease, and while not at present being used for grazing, in the past was well-grazed and partly cleared. When visited in Easter 1972 there were signs of recent firing and it is probable that the island has been burnt regularly since its first settlement in the nineteenth century. The ruins of a stone building and a deep but dry well testify both to past permanent settlement and to one possible reason for its demise. The island supports two major muttonbird breeding colonies, one in the north-west of the island and one in the south-east. However, several days after the commencement of the muttonbird season only one live bird was observed although carcasses of adults and the feathers of the younger birds were much in evidence.

Clearing, firing, grazing and the introduction of the rabbit have undoubtedly altered the vegetation considerably from its natural state. Nevertheless, the vegetation present today exhibits some interesting correlations with environmental factors and is composed largely of native species. Thus the changes that have almost certainly occurred have probably been in the form of structural change and possibly floristic depletion.

The vegetation of the island was studied during a three-day field trip in Easter 1972. The island was traversed several times and notes made on the floristic composition and structure of the vegetation in representative parts of the island. These notes and aerial photograph interpretation were used to construct the maps of plant com-

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munities (Figure 2) and tree species distribution (Figure 2). Vascular plant species observed during the course of the field trip were collected, pressed and identified where possible to the species level (Appendix).

The communities mapped have been defined in terms of the dominant or codominant species taking the term dominant to mean the species with the greatest cover in the tallest stratum, and according to the structural classification of Specht (1970). These communities are discussed below:

1. *Eucalyptus* Woodland

Two eucalypt species are found on the island. *E. viminalis* is concentrated along the east coast and in the saddle in the centre of the island, while *E. tenuiramis* (formerly known as *E. tasmanica*) occurs elsewhere and in mixture with *E. viminalis*. The trees vary in their density and height. Dense stands of *Acacia dealbata* 1-3 m high are found as a second or sometimes dominant stratum throughout much of this community. Some areas bereft of eucalypts have been included with the eucalypt woodland because of the dominance of this species. Where the thickets of *A. dealbata* are found the third and lowest stratum tends to be dominated by *Pteridium esculentum* with *Lomandra longifolia*, *Astroloma humifusum* and *Carpobrotus rossii* variably subdominant. In some areas of eucalypt woodland *Acacia melanoxylon* forms an often dense second stratum up to 4 m in height. This species is most common along seepage lines. Where cover is complete little grows beneath the blackwoods, but in more open areas there is a dense 1-2 m high growth of *Lomandra longifolia*, *Carex appressa*, *Juncus pallidus* and *Pteridium esculentum* under which can be found *Acaena anserinifolia*, *Tetragonia implexicoma*, *Viola hederacea* and *Dichondra repens*

Where the eucalypt dominated community occurs on the steep eastern slope of the island the trees are both tall and reasonably dense (Plate 1). Here *Banksia marginata*, *Casuarina littoralis* and *A. melanoxylon* form a sparse second stratum and other species that are found include *L. longifolia* (dominant in the lowest stratum), *Lepidosperma squamata*, *Carpobrotus rossii*, *Pimelea linifolia*, *Scirpus nodosus*, *Acaena anserinifolia*, *Astroloma humifusum*, *Amperea xiphoclada*, *Exocarpos strictus*, *Dichelachne crinita*, *Pteridium esculentum* and *Dichondra repens*. Around the summit of the island the understorey of the eucalypts again changes character the species found including *Epacris impressa*, *Astroloma humifusum*, *Aotus ericoides*, *Haloragis tetragyna*, *L. longifolia*, *P. esculentum*, *A. xiphoclada*, *Acacia suaevoleans* and *Banksia marginata*. This type of association is also found in the northern part of the community.

The boundaries of the *Eucalyptus* woodland are indistinct except where it is juxtaposed to the *Astroloma humifusum* open-heath. At the moment the community is confined to the weakly podsolized soils formed on

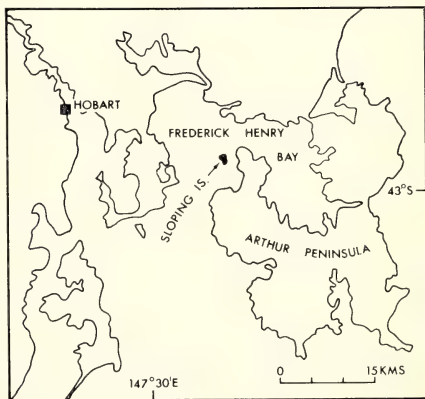


Figure 1. Locality map.

recent cover sands. However, eucalypt seedlings are readily found around the margins of the taller trees and it seems probable that frequent firing has reduced both the area of this community and the density of the dominant species within it. The other soil types on the island support eucalypt com-

munities in similar situations elsewhere and may have been at least partially occupied by eucalypts in the past on Sloping Island.

2. *Casuarina stricta* Low-Open Forest

This community is virtually confined to the western aspect of the island. The coverage of *C. stricta* varies from

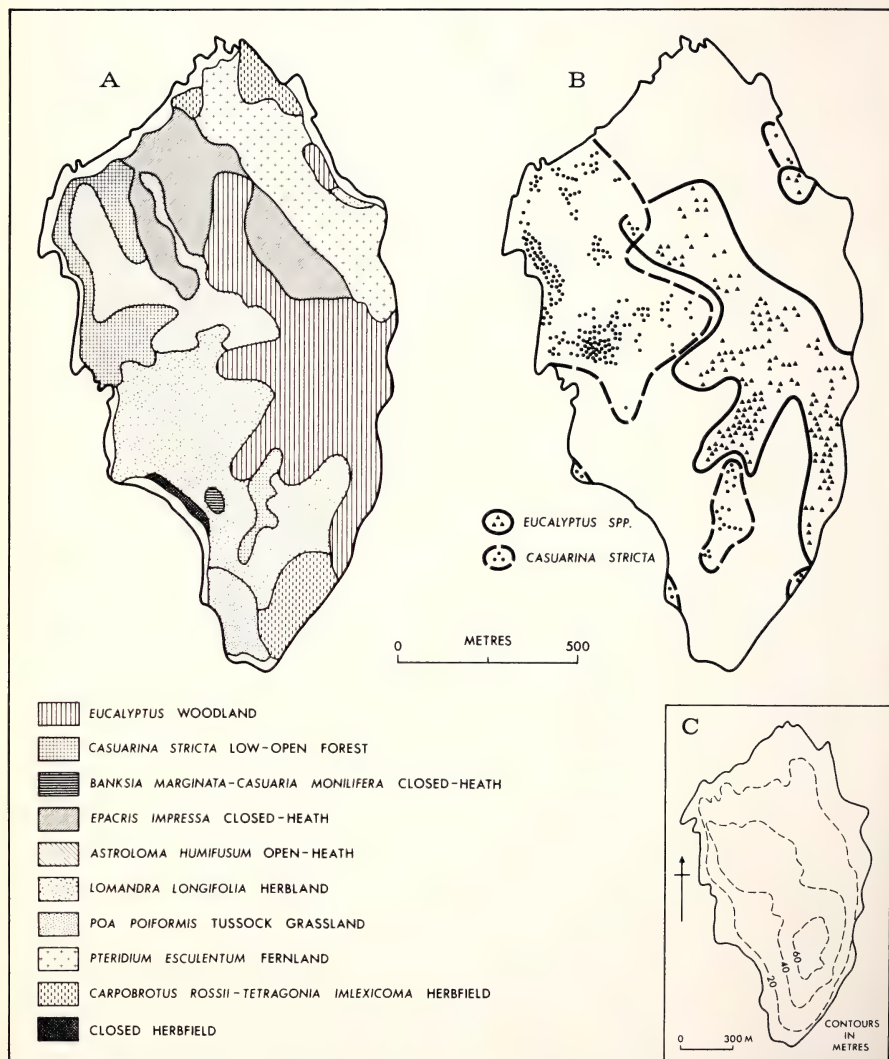


Figure 2. Distribution of plant communities (A), distributions of *Eucalyptus* spp. and *Casuarina stricta* (B) and topography (C).

sparse to dense. In the denser stands the understorey is generally bare as is recorded for the same community elsewhere in southern Australia (Parsons, 1966; Kirkpatrick, Massey and Parsons, 1973). However, in its less dense phase several subordinate shrub species including *Pomaderris elliptica*, *Olearia phlogopappa* and *Pultenaea daphnoides* are found underlain by a sparse growth of small herbs and shrubs (Plate 2). The community is found on two soil types, podzolics on mudstone and brown earths on dolerite, being absent from the areas covered by recent sands. The distributions of the eucalypt species and *Casuarina stricta* on Sloping Island (Figure 2) reflect a distinct relationship observable elsewhere in southern Tasmania. *C. stricta* is almost certainly a more salt resistant tree than either of the eucalypts found on Sloping Island. It maintains a rounded crown in all but the most exposed situations whereas the eucalypts where they occur near the sheoak are distinctly asymmetrical and exhibit leaf tip necrosis on their seaward shoots. Thus, the eucalypts are found almost entirely on the sheltered side of the island whereas the sheoaks are most dense on the exposed cliffs of the western coast. The sheoaks' avoidance of the sandy soils is also typical of the species, whereas *E. viminalis* is one of the most common species found in relatively sheltered situations in sandy coastal areas.

3. *Banksia marginata-Casuarina monilifera* Closed-Heath

This community occupies a restricted area in the south-west of the island where it is partially sheltered from the effects of strong salt-laden winds by the local topography. The species found in this dense community include *B. marginata*, *C. monilifera*, *Epacris impressa*, *Lepidosperma squamata*, *Aotus ericoides*, *Amperea*

xiphoclada, *L. longifolia* and *P. esculentum*, the former two species composing the tallest stratum and the latter two species being sparse in their occurrence. The community may have been more extensive in the past when the island was subjected to less frequent firing than at present.

4. *Banksia marginata-Epacris impressa* Closed-Heath

The area mapped as composing this community is in fact extremely heterogeneous. *B. marginata* and *E. impressa* occur throughout much of this area but in parts *Acacia dealbata*, *A. melanoxylon*, *P. esculentum* or *L. longifolia* are dominant. The area has almost certainly been reduced from the eucalypt community through excessive firing and grazing, and the continuance of the vegetation found at



Plate 1. *Eucalyptus* woodland on the eastern slope of the island.

present probably depends on the continuance of these disturbances. The community is found on the recent sands and has sharp boundaries with contiguous communities except for the *Eucalyptus* woodland.

5. *Astroloma humifusum* Open-Heath

This community is found on skeletal to podzolic soils formed on Permian mudstones and its boundaries with other communities excepting the *Casuarina stricta* low-open forest are sharp (Plate 3). The species which characterize this community include *Astroloma humifusum*, *Danthonia laevis*, *D. caespitosa*, *Pultenaea daphnoides*, *Hibbertia fasciculata*, *H. procumbens* and *Lissanthe strigosa*. *L. longifolia* has a sparse occurrence within this community but *P. esculentum* is almost totally absent. Part of the area of this community has been subject to recent clearing which does not seem to have much altered its floristic composition but may have eliminated *Casuarina stricta*, and has resulted in a sparser than normal vegetation.

6. *Lomandra longifolia* Herbland

L. longifolia is found in most communities present on the island and is the dominant species over much of the south of the island. Typically *L. longifolia* accounts for fifty per cent of the cover with *P. esculentum* the next most numerous species and *Scirpus nodosus*, *Lepidosperma squamata*, *Juncus pallidus* and *Astroloma humifusum* being other common associates of the lily. The community is confined to the recent sands and probably represents a stage in fire and grazing induced degeneration from the eucalypt woodland over much of its area.

7. *Poa poiformis* Tussock Grassland

This community is confined to the exposed south-west corner of the island. Its inland boundary coincides with a change from skeletal soils on dolerite to the recent cover sands which are occupied by the previous community discussed (Plate 4). Associates of the *Poa* include *Carpobrotus rossii*, *Acaena anserinifolia*, *Astroloma humifusum* and *Dichelachne crinita*, the latter two species being



Plate 2.

Casuarina stricta low-open forest.

absent close to the coast. The *Poa* community is found inland from a narrow zone dominated by *Stipa tere-tifolia*, a similar situation being found on both Curtis and Rodondo islands in Bass Strait (Kirkpatrick, Massey and Parsons, 1973), where the *Poa* community is far more extensive.

8. *Pteridium esculentum* Fernland

P. esculentum, like *L. longifolia*, is common over most of the island but attains dominance only in the area which has been cleared and ploughed in the northern part of the island. Species associated with bracken in this man induced community include *Rumex acetosella*, *Medicago* sp., *Holcus lanatus*, *Cirsium vulgare*, *Sonchus oleraceus* and *Scirpus nodosus*.

9. *Carpobrotus rossii*-*Tetragonia implexicoma* Herbfeld

This community occupies the rookery areas (Plate 5), the dominants forming a succulent mat between patches of ground bared by mutton-bird activity. Many of the introduced plants found on the island occur within this community including *Lycium*

ferocissimum, *Urtica urens* and *Cirsium vulgare*. *Carpobrotus rossii* is dominant over most of the northern patch of this community while *Tetragonia implexicoma* is more common in the southern patch.

10. Closed Herbfeld

This community has developed on a degraded cliff face in response to seepage from the sands that lie above the cliff. Two species found on the island were confined to this community, *Microsorium diversifolium* and *Cotula reptans*. Other species found included *Poa poiformis*, *Viola hederacea*, *Acaena anserinifolia*, *Carex appressa*, *Juncus bufonius*, *Acacia verticillata*, *Selliera radicans*, *Lobelia alata*, *Tetragonia implexicoma* (dominant in the southern part of the community), and *Disphyma blackii*. Smaller soaks occur elsewhere along the shores of the island especially along the north coast but had too small an area to be mappable.

Several species found on the island were virtually confined to the rocky coasts. These include *Correa alba*, *Distichlis distichophylla*, *Rhagodia*

Plate 3.

Astroloma humifusum
open-heath in
foreground
with *Lomandra longifolia*
herbland in
middleground.



baccata, *Myoporum insulare*, *Leucopogon parviflorus*, *Salicornia quinqueflora*, *Pelagonium australe* and *Stipa teretifolia*. Unfortunately, the area occupied by this distinct coastal assemblage of species was too limited to be mappable.

Four factors, disturbance, soil type, exposure to salt laden winds and moisture availability, seem to be most important in controlling the distribution and type of plant communities on Sloping Island.

The contribution of man to disturbance has been in increasing the frequency of fire, introducing grazing animals, and in clearing and ploughing. The increased fire frequency has probably reduced the area of the *Eucalyptus* woodland to the advantage of the *Lomandra* and closed-heath communities, and possibly has also extended the *Lomandra* community at the expense of the closed-heath communities. Grazing, clearing and ploughing have probably combined in introducing and establishing alien weeds in the vegetation of the island. Certainly without clearing and ploughing the *Pteridium* community would not exist and the *Astroloma* com-

munity might not have been so extensive. The breeding muttonbirds provide another source of disturbance the nature of which has been documented by Gillham (1960, 1961). Without their activities the *Carpobrotus-Tetragonia* community might not have existed.

Soil boundaries on the island almost invariably correspond with community boundaries indicating that the edaphic factor is of some importance. The *Astroloma* community is confined to soils formed on Permian mudstone, while the *Casuarina* community is found also on soils formed on dolerite but not on the soils formed on recent sands. The boundary between the *Poa* community and the *Lomandra* community corresponds with a sharp break in soil type, the *Lomandra*, *Eucalyptus*, *Pteridium*, *Carpobrotus-Tetragonia* and closed-heath communities all being confined to the soils formed on recent sands.

The influence of relative exposure to salt laden winds is most evident in the location of the *Poa* community and in the relative distributions of the two species of eucalypt and *Casuarina stricta*.



Plate 4

The boundary between the *Poa poiformis* tussock grassland and the *Lomandra longifolia* herbland. Looking north-west with the closed herbfield in the middleground.

The areas of the island where seepage reaches the surface support distinct vegetation types, including the closed herbfield community and the *Acacia melanoxylon* phase of the *Eucalyptus* woodland, indicating that moisture availability plays an important role in defining the limits of at least some community types.

The flora of the island contains elements from the drier eucalypt forests of south-eastern Tasmania as well as a strong coastal and island element, indicated by the fact that forty per cent of the species that occur on Curtis Island and/or Rodondo Islands in Bass Strait also occur on Sloping Island. Only three species (*Eucalyptus*

tenuiramis, *Lepidosperma squamata*, and *Pomaderris elliptica*) found on the island are Tasmanian endemics.

Further work on other southern Tasmanian islands, especially the more exposed and least disturbed of them, could reveal valuable data in relation to the affinities of the vegetation of these islands to those in Bass Strait in floristics, plant communities and susceptibility to disturbance, as well as enlarging our limited knowledge of their vegetation *per se*.

Acknowledgement

I would like to thank Mrs. J. E. S. Townrow for her help with identification of the grasses and Mr. G. Van der Geer for drawing the figures.

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Plate 5.

Muttonbird rookery in the north-west of the island. The species visible are *Carpobrotus rossii*, *Lomandra longifolia* (being undermined) and *Lycium ferocissimum*.



Appendix

SPECIES OBSERVED ON SLOPING ISLAND

- DENNSTAEDTIACEAE: *Pteridium esculentum* (Forst. f.) Nakai.
- POLYPODIACEAE: *Microsorium diversifolium* (Willd.) Copeland.
- GRAMINEAE: **Aira caryophyllea* L., *Agrostis aemula* R. Br., **Anthoxanthum odoratum* L., *Danthonia caespitosa* Gaudich., *D. laevis* J. W. Vickery, *Deyeuxia quadriseta* (Labill.) Benth., *Dichelachne crinita* (L.f.) Hook. f., *Distichlis distichophylla* (Labill.) Fassett, **Holcus lanatus* L., **Nassella trichomata* (Nees) Hack. ex Arech., *Phragmites communis* Trin., *Poa poiformis* (Labill.) Druce, **Polypogon monspeliensis* (L.) Desf., *Stipa mollis* R. Br., *S. teretifolia* Steud.
- CYPERACEAE: *Carex appressa* R. Br., *Lepidosperma squamata* Labill. *Scirpus cernuus* Vahl, *S. nodosus* Rottb.
- CENTROLEPIDACEAE: *Centrolepis strigosa* (R. Br.) Roem. et Schult.
- JUNCACEAE: *Juncus bufonius* L., **J. capitatus* Weig., *J. maritimus*, Lam., *J. pallidus* R. Br., *J. planifolius* R. Br.
- LILIACEAE: *Dianella revoluta* R. Br., *D. tasmanica* Hook. f., *Lomandra longifolia* Labill.
- CASUARINACEAE: *Casuarina littoralis* Salisb., *C. monilifera* L. A. S. Johnson, *C. stricta* Ait.
- URTICACEAE: **Urtica urens* L.
- PROTEACEAE: *Banksia marginata* Cav.
- SANTALACEAE: *Exocarpos strictus* R. Br.
- POLYGONACEAE: **Rumex acetosella* L., **R. crispus* L.
- CHENOPODIACEAE: **Atriplex hastata* L., **Chenopodium album* L., *Rhagodia baccata* Moq., *Salicornia quinqueflora* Bunge ex Ung.-Stenb.
- AIZOACEAE: *Carpobrotus rossii* (Haw.) N.E. Br., *Disphyma blackii* R. J. Chinnock, *Tetragonia implexicoma* (Miq.) Hook. f.
- PITTOSPORACEAE: *Bursaria spinosa* Cav.
- ROSACEAE: *Acaena anserinifolia* (Forst. et Forst. f.) Druce, **Rosa rubiginosa* L.
- MIMOSACEAE: *Acacia dealbata* Link, *A. melanoxylon* R. Br., *A. suaeveolens* (Sm.) Willd., *A. verticillata* (Lher.) Willd.
- PAPILIONACEAE: *Aotus ericoides* (Vent.) G. Don., *Bossiaea cinerea* R. Br., *B. obcordata* (Vent.) Druce, *B. prostrata* R. Br., *Kennedia prostrata* R. Br., **Medicago* sp., *Pultenaea daphnoides* J. Wendl.
- GERANIACEAE: *Geranium potentilloides* Aucct., non certe Forst. f. ex Willde, *Pelargonium australe* Willd., **P. "domesticum"* L. H. Bailey — agg.
- OXALIDACEAE: *Oxalis corniculata* L.
- RUTACEAE: *Correa alba* Andr.
- EUPHORBIACEAE: *Amperea xiphoclada* (Sieb. ex Spreng.) Druce.
- RHAMNACEAE: *Pomaderris elliptica* (Labill.).
- DILLENACEAE: *Hibbertia fasciculata* R. Br. ex DC., *H. procumbens* (Labill.) DC.
- VIOLACEAE: *Viola hederacea* Labill.
- THYMELACEAE: *Pimelea humilis* R. Br., *P. linifolia* Sm.
- MYRTACEAE: *Eucalyptus tenuiramis* Miq., *E. viminalis* (Labill.), *Leptospermum scoparium* Forst. et Forst. f.
- ONAGRACEAE: *Epilobium* sp.
- HALORAGACEAE: *Haloragis tetragyna* (Labill.) Hook. f.
- UMBELLIFERAE: *Daucus glochidiatus* (Labill.) Fisch. et al.

EPACRIDACEAE: *Astroloma humifusum* (Cav.) R. Br., *Epacris impressa* Labill.,
Leucopogon parviflorus (Andr.) Lindl., *Lissanthe strigosa* (Sm.) R. Br.
 PRIMULACEAE: **Anagallis arvensis* L., *Samolus repens* (Forst. et Forst. f.) Pers.
 GENTIANACEAE: **Centaurium minus* Garsault.
 CONVULVULACEAE: *Dichondra repens* Forst. et Forst. f.
 SOLANACEAE: **Lycium ferocissimum* Miers.
 SCROPHULARIACEAE: **Verbascum virgatum* Stokes.
 LABIATAE: **Marrubium vulgare* L.
 MYOPORACEAE: *Myoporum insulare* R. Br.
 CAMPANULACEAE: *Lobelia alata* Labill., *Wahlenbergia* sp.
 GOODENIACEAE: *Selliera radicans* Cav.
 COMPOSITAE: **Cirsium vulgare* (Savi) Ten., *Cotula coronopifolia* L., *C. reptans*
 (Benth.) Benth., **Gnaphalium candidissimum* Lam., *Helichrysum apiculatum*
 (Labill.) DC., *H. dendroideum* N. A. Wakefield, **Hypochoeris radicata* L.,
 **Leontodon taraxacoides* (Vill.) Merat, *Olearia phlogopappa* (Labill.) DC.,
Senecio lautus Forst. f. ex Willd., **Sonchus oleraceus* L.

*species not native to Tasmania. *Nassella trichomata* and *Stipa mollis* were observed on the island by J. E. S. Townrow but were not collected by the author.

The list is incomplete as many annuals and geophytes have certainly been missed owing to the restricted period in which collecting took place, and some monocotyledenous plants not in head have probably also been missed.

The Origin of Generic Names of the Victorian Flora

Part 1 – The Person behind the Name (conclusion)

[continued from 90 (10)]

by JAMES A. BAINES

Sterculia. Named by L. after Sterculius, Roman god of dung and privies. (The Romans in their later period of decadence deified unpleasant things, other examples being Caca, Crepitus and Petunda.) This odd provenance is explained by the fact that some species, including the type species, have an offensive odour (Latin *stercus* = dung). *S. diversifolia* has been superseded as the botanical name of the Kurrajong, which has been for a long time *Brachychiton populneus*. The name is familiar still in the family name Sterculiaceae, and *Sterculia* is in the Queensland flora.

Stuartina. Named by Sonder in 1853 after Charles Stuart (1802-1877), gardener and collector in N.S.W., and

in Tasmania (for Ronald Campbell Gunn). He collected algae for Harvey, author of *Manual of British Algae* (1841). The specific name *stuartii* also commemorates him, e.g. *Leucopogon stuartii*, *Helipterum stuartianum* and *Eucalyptus stuartiana* (former name of *E. bridgesiana*) also were named after him.

Swainsona. Named by Salisbury in 1806 after Isaac Swainson (1746-1812), M.D., who had a private botanic garden at Twickenham, and made a collection of 11,000 botanical plates, now in the herbarium of the British Museum. His cousin, William Swainson, wrote a *Botanical Report on Victoria*, 1853; his enormous list of species of *Casuarina* throws grave

doubts on his competence as a botanist, even though he became F.L.S. in 1816 and F.R.S. in 1820. He botanized in Malta, Sicily, Brazil and New Zealand as well as Australia. Hooker named *Orthotrichum swainsoni* after him.

Templetonia. Named by R. Brown in 1812 after John Templeton (1766-1825), of Belfast, Northern Ireland, author of *Flora Hibernica* (5 volumes). His drawings of Irish fungi and lichens are in the herbarium of the British Museum, London.

Thomasia. Named by Gay in 1821 after Swiss botanists, Peter and Abraham Thomas, of Bex, brothers who made many collections. Abraham's son, Philipp (died 1831 in Sardinia), Ludwig (died 1824 at Naples) and Emanuel were also botanists.

Threlkeldia. Named by R. Brown in 1810 after Rev. Dr. Caleb Threlkeld (1676-1728), M.A., M.D., an English botanist who settled in Dublin as divine and physician. He established his own botanic garden there. He wrote a *Synopsis of Irish Plants* (in Latin). He was truly "British", born in Cumberland (England), educated at tertiary level in Glasgow and Edinburgh (Scotland), and worked in Ireland.

Tieghemopanax. Named by Viguier in 1905 after Philippe Édouard Léon Van Tieghem (1839-1914), French botanist, known for his studies on fungi and bacteria; he proposed a new classification of plants. *T. sambucifolius* was named *Panax sambucifolius* in 1830, but Van Tieghem's name was prefixed when the generic difference was established. The name means "of Tiegem", a village in Belgium founded by Flemings. His ancestors went to France, and the h was introduced in the spelling to preserve the hard sound in spoken French, or perhaps an old

spelling of the village name was Tieghem (cf. Arnhem in Holland, the -hem being cognate with -heim in German and -ham in English placenames). An indication of Van Tieghem's status as a versatile botanist is the references to his achievements (including "firsts" in plant anatomy and cytology) on no fewer than 29 pages of De Virville's history of botany in France, which also has a photograph of him.

Todea. Named by Willdenow in 1802 after Heinrich Julius Tode (1733-1797), a German cryptogamic botanist, who specialized in the fungi of Mecklenburg.

***Tradescantia.** Named by L. in 1753 after John Tradescant (1608-1662), gardener to King Charles I; he visited Virginia in 1654. As a result of this collecting trip, he introduced into Britain *Tradescantia* (Wandering Jew), *Liriodendron* (North American Tulip-tree) and other plants. This appears to be the correct person honoured (as given by Smith and Stearn), but Britten and Boulger state that the genus was named after his father, also John, who was probably born in Suffolk and died in 1637 at Lambeth, where he had a plant museum and botanic garden. He too was gardener to King Charles I; he went to Russia in 1618. He had gone to Holland in 1611 when he was gardener at Hatfield to Lord Salisbury, then on to Paris. He was an ardent plant collector, who even signed on as a gentleman volunteer against the corsairs so that he could collect plants in North Africa (see Mea Allen's *The Tradescants* and Tyler Whittle's *The Plant Hunters*).

Vallisneria. Named by L. after Antonio Vallisnieri de Vallisnera (1661-1730), Italian doctor and botanist, professor at Padua. The name means "black valley".

Velleia. Named by Smith in 1798 after Thomas Velley (1748-1806); D.C.L., F.L.S., a lieutenant-colonel who became a noted algologist; of Bath, and later of Liverpool, where his herbarium of 18 volumes is kept. Author of *Coloured Figures of Marine Plants*, 1795.

Ventenatia. Cavanilles named a genus after P. Ventenat (1757-1808) in 1797, but the species validly bears the name given to it in 1810 by R. Brown, *Astroloma humifusum*. Smith's *Ventenatia* is now *Stylidium*. Leschenault's *Ventenatum* is now *Diplolaena*. Ventenat was one of the naturalists of the d'Entrecasteaux expedition in the "Recherche" and "Espérance", the others being Deschamps, La Billardiére, Blavier (mineralogist) and Riche. He was an able draughtsman, and learned to describe plants accurately from L'Héritier, after he left the Church. He decided to dedicate his life to scientific botany as a result of a visit to England, during which he visited the finest botanical gardens. A fine work on *The Garden of the Malmaison*, undertaken at the instigation of the future Empress Josephine, was illustrated by the famous Redouté with 120 colour plates.

Veronica. Named by L. apparently in honour of Saint Veronica. Victoria has 15 species, but two of them, *V. derwentiana* and *V. perfoliata*, have been transferred to *Parahebe* by some botanists. New Zealand's numerous species of *Hebe* were formerly included in the genus *Veronica*. The name Veronica means "true image", from the legend about Christ's image appearing on the cloth with which St. Veronica is said to have wiped the face of Jesus on the way to Calvary.

Villarsia. Named by Ventenat after Dominique Villars (1745-1814), a French botanist and physician, author of *Histoire Naturelle des Plantes du*

Dauphiné, 1786-9. He also spelt his name Villar, which was his birthplace. He was chief doctor of the hospital at Grenoble, then professor of botany and medicine at Strassburg.

Vittadinia. Named by Lesson and A. Richard in 1832 after Carlo Vittadini (1800-1865), an Italian botanist, who wrote on fungi.

***Vulpia.** Named by Gmelin after J. S. Vulpus (1760-1840), a German chemist. Our five introduced species were formerly included in *Festuca* (fescue grasses).

Wahlenbergia. Named by Schrader after Göran Wahlenberg (1780-1851), professor of medicine and botany at Uppsala, 1829-51. A pioneer in phytogeography and in plant chemistry, he wrote floras of Lappland, Sweden, and the Carpathians.

Waitzia. Named by Wendland after F. C. A. Waitz in 1808. He was a traveller in Java, who wrote on the plants of that island.

***Watsonia.** Named by Miller after Sir William Watson (1715-1787), M.D., F.R.S., an electrician, apothecary and physician, of London. He was a specialist on the grasses. He became an F.R.S. in 1741, and was knighted in 1786.

***Wedelia.** Named by Baron von Jacquin after Georg Wolfgang Wedel (1645-1721), professor of botany at Jena, Germany. The genus was named in 1763.

Westringia. Named by Smith after Dr. Johan Peter Westring (1753-1833), a Swedish writer on lichens; he was physician to the king of Sweden.

Wilsonia. Named by R. Brown after John Wilson (died 1751), of Kendal, Westmorland, shoemaker and baker! and amateur botanist, who wrote a *Synopsis of British Plants* (1744).

Wittsteinia. Named by F. Mueller in 1861 after Dr. G. C. Wittstein,

author of a German botanical dictionary, 'Etymologisch - botanisches Handwörterbuch' (Erlangen, 1856), giving derivations of generic names, and a number of pharmaceutical works, one of which was translated from the German by Baron von Mueller and published in Melbourne by McCarron, Bird & Co. Both these books are in the library of the National Herbarium, South Yarra. *Wittsteinia* is one of only two genera endemic to Victoria, *W. vacciniacea* being the Baw Baw Berry.

Wolffia. Named by Horkel after J. W. Wolff (1778-1806), a German physician and botanist. *W. arrhiza* (Tiny Duckweed) is the smallest known flowering plant.

Woodwardia. Named by Smith after Thomas Jenkinson Woodward (1745-1820), LL.B., F.L.S., an English botanist, who was a major contributor to Withering's *Systematic Arrangement of British Plants*, 1776, and wrote a *Flora of Suffolk*. *W. caudata* is now *Doodia caudata*.

Wurmbea. Named by Thunberg after F. V. Wurmbea, a Dutch naturalist. Our species is now *Anguillaria dioica*, Early Nancy.

Zaluzianskya. Named by Schmidt after Adam Zaluziansky von Zaluzian (1558-1613), a physician and botanist of Prague.

***Zantedeschia.** Named by Sprengel after Dr. Giovanni Zantedeschi (1773-1806), an Italian physician and botanist. *Z. aethiopica* is the White Arum Lily.

Zichya. Named by Baron von Huegel after the Hungarian noble family von Zichy, patrons of horticulture. The well-known Australian legal family of Zichy-Woinarski stems from a Polish branch of the family.

Zieria. Named by Smith in 1798 after Jan Zier, a Polish botanist who died in London (as John Zier) in 1796.

F.L.S. 1788. He wrote many of the descriptions in Dickson's *Fasciculi of Cryptogamic Plants*. His plants and manuscripts are in the herbarium of the British Museum, many collected in Electorate of Hanover.

Zoisia. Named by Willdenow in 1801 after Karl von Zoys (or von Zois) (1756-1800), an Austrian botanist, plant collector and landed proprietor of Carniola.

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- Botanical Pioneers in Victoria — I (Vol. 66, 83-89).
 Botanical Pioneers in Victoria — II (Vol. 66, 103-109).
 Botanical Pioneers in Victoria — III (Vol. 66, 123-128).

book review

Aquatic Plants of Australia

by HELEN I. ASTON

Published by Melbourne University Press.
362 pp., incl. 138 pen and ink drawings.

Price \$21.

This book comes as a most welcome addition to the very small number of authoritative and comprehensive works at present available on Australian plant life.

In his introduction Professor Turner describes it as "a highly professional production which will be of immense value to academic and applied biologists". However, the layout of the text, the excellent descriptions of individual species with supplementary notes on distribution and, above all, the line drawings make it a most appealing and useful work for the amateur in quest of information on a fascinating part of the plant world.

A total of 222 species is treated, 109 of which occur in Victoria; all the latter are illustrated, mostly with the author's own drawings taken from living material which she has collected herself. As she points out there is no firm boundary dividing the aquatic from the non-aquatic species, and only those plants entirely dependent on the presence of permanent water, and never found far from it are dealt with fully in the book. A few species of true aquatics have been deliberately omitted, notably some of the sedges, because of the difficulty of dealing with them apart from other very similar semi-aquatic or terrestrial species. On the other hand some semi-aquatics are included for the

sake of completeness and to avoid misidentification.

Each species is covered by descriptive notes and almost all are illustrated. Family and generic descriptions and botanical keys have been included for some of the larger families dealt with. Generally the descriptions are fuller for those species which occur in Victoria, and distribution maps for these are also included.

As well as the main text there are appendices dealing with Water Hyacinth, Sea Grasses and a distribution chart of species according to State. There is also a bibliography with over 200 references, and location maps for Victoria and Australia. The introduction deals briefly with climate and physiography and an excellent illustrated glossary completes the work.

Miss Aston is a senior staff member of the National Herbarium, Melbourne; her book is the culmination of ten years' work which has included much original research into aquatic plants. She is well known for her involvement with amateur naturalist groups, and as a lecturer in both botanical and ornithological topics. Perhaps it is this contact with amateurs and students which has resulted in the stated aim "not to avoid detail, but rather to present it in a way which should be comprehensible to all who wish to understand". It is apparent from first opening the book that this aim has been achieved in a manner which makes the book a delight to use.

M. G. CORRICK.

The "Matterhorn" Aboriginal Shelter and its Possible Mythological Significance

by ALDO MASSOLA*

This article describes an Aboriginal painted shelter discovered in the Victoria Range, Western Grampians, as far back as 1966, which, through a misunderstanding, has remained undescribed; this despite the fact that it is obviously quite important for the study of the mythology and art of the Aborigines of this area.

The shelter was discovered by Mr. Ellis Tucker, of Brit Brit, and by means of directions supplied by him Mr. Ian McCann, Tourist Information Officer, of Stawell, and I were recently able to locate it. It is situated about 0.6 km in a south-easterly direction from the now classic Cultivation Creek Shelter No. 5, on the north-west base of a huge tor, the pointed top of which, towering above the trees, resembles in shape the famous Matterhorn Peak on the Italian-Swiss frontier. For this reason we broke our self-imposed rule of using serial numbers for recording all new sites and have called this 'the Matterhorn Shelter'.

The 'shelter' is really an overhang of the rock face and is about 8 m wide, 2.5 m high, and almost 3 m deep, with the back wall featuring a prominent fault, a perpendicular fissure, or cleft, terminating into a large irregular cavity; and around it the Aborigines long ago painted a number of lizards in red ochre, positioning them as if issuing from the cavity. It is impossible to say how many were originally painted, since they are now so faded as to be barely visible; but by diligent examination of the rock face, eleven lizards varying in length from 20 cm to 46 cm can still be discerned. No other symbol or design appears to be represented in the shelter.

Those who are familiar with the painted shelters in the Victoria Range will recollect that lizard renditions predominate, although in some cases they are associated with other designs; but then the latter are always small in size and rendered in a linear, or thin line manner, like the lizards. Because of this peculiarity I have, in my former writings in the *Victorian Naturalist* and elsewhere, called this art the 'Lizard Style' and claimed that many of these shelters were connected with the mythology of the Lizard totem.

My co-searches in these ranges agree with this nomenclature and hypothesis, and when Mr. Tucker informed the rest of us of his discovery of the Matterhorn shelter he advanced his belief that he had located the mythical 'home' or 'birthplace' of all the lizards in the Grampians.

To fully appreciate the import of this claim we must go further afield, beyond the Grampians or even the confines of Victoria. Anthropologists agree that despite regional differences, which are mainly due to geographical and ecological variations, there was a fundamental unity of customs among all Aboriginal tribes throughout Australia. Everywhere the Aborigines believed that the physical features of the landscape were the results of the activities of Dreamtime ancestors. These beings, in their erratic wanderings, were responsible for the creation of all the waterholes, artifacts, rock shelters, customs, trees, ceremonies, mountains, and animals and edible plants in the tribal territory. They travelled from place to place, meeting other Dreamtime spirits, fighting with

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them, chasing and copulating with female beings, and drifting off in their separate ways, sometimes remaining in the tribal territory, more often passing into the territory of another tribe, but eventually all growing very tired and 'sitting down', to be transformed into rocks and trees, mountains or waterholes, or rising into the sky to become planets and stars.

Their creative essence however remained, and the natural features they were turned into became the spirit centres from where all future totem members, both human and animal, originated.

Many fissures or natural holes in rock surfaces have been recorded as representing the vulva of one or another of the female beings with whom the Ancestors copulated. Spencer and Gillen discussed and illustrated one such in Central Australia, an isolated rock protruding from the ground amidst mulga scrub. It has a round hole on one side, and from it the spirit-children of the Plum-tree Totem emerged whenever a woman passed in its vicinity, and she would be fertilized.¹ Mountford illustrates a fissure in a rock shelter in the MacDonnell Ranges which represents the vulva of the Wild-dog Woman with whom Jarapiri, the Snake-Man, copulated.²

The general configuration of the Matterhorn shelter is very similar to Mountford's example. The unusual top of the tor could well have suggested to the Aborigines the member of a virile male ancestor, while the fissure and the hole in the shelter would have denoted the vulva of a female being. The painted lizards indicate that she was fertilized. The tor is not far from Cultivation Creek No. 5, where natural peculiarities of the rock face are delineated with red ochre to emphasise their fancied resemblance to a male and two female sexual organs.³ In No. 5 and nearby No. 10, as well as in several other shelters in the area, two human figures, one tall and one short, most likely a male and a female, are shown as if holding hands, as if they were inseparable. All this points to the locality having being the centre of creative activities on the part of Dreamtime beings.

We don't know who this particular male Ancestor was, but there is little doubt that at the Matterhorn shelter he met, and fertilized, the Lizard-Woman.

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1. Spencer, B., and F. J. Gillen, *The Native Tribes of Central Australia*. London, 1899.
2. Mountford, C. P., *Wimbaraku and the Myth of Jarapiri*. Adelaide, 1968.
3. Massola, A., Victoria Range Shelters. *Vict. Naturalist* 81, Oct. 1964.

PHOTOFLORA '74

The Native Plants Preservation Society is now planning Photoflora '74, its eighth biennial competition and exhibition featuring colour slides of Australian wildflowers. Photoflora '74 is to include a new section for slides of Australian birds in their habitat. The award for this section is a specially designed silver medallion, presented by Bendigo Field Naturalists' Club and named the Redvers J. Eddy Award in honour of this well-known naturalist and bird photographer, an active member of their Club until his death in 1968.

Photoflora Entry Forms are now available from the Competition Secretary, Miss B. C. Terrell, 24 Seymour Avenue, Armadale, 3143. Public screenings have already been arranged in 17 suburban and country centres during March and April, 1974, and a few dates are still available if any group would like to sponsor another screening. Screening details will be published later.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 12 November — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for the evening — "Eucalypts": J. H. Willis.

14 January 1974 — Members' Night.

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Thursday, 13 December — Botany Group "Australian Plants in their Natural Environment", by Leon Costermans, also annual election of Office-bearers.

Wednesday, 26/12/1973-Tuesday, 1/1/1974 — Port Campbell. A coach has been chartered for this excursion which will be used for day trips to surrounding areas, probably including a visit to Tower Hill and another to the Otways, but the excursion secretary would be glad of suggestions from those knowing the area well. Motel accommodation for the members travelling by coach has been booked on a dinner, bed and breakfast basis, quoted at \$11.00 per day at time of booking. Coach fare: \$24.00, to be paid by December General Meeting. The coach will leave Flinders Street outside the Gas and Fuel Corporation at 9 a.m. Bring a picnic lunch.



The F.N.C.V. Council members and the Editor wish to extend the

Compliments of the Season

to all members and readers; and we also hope that 1974 offers the
opportunity for the fulfilment of your ambitions.



The Victorian Naturalist

Editor: G. M. Ward

Assistant Editor: G. Douglas

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5 December, 1973

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Front Cover:

The Sugar Glider photographed by John Wallis, exemplifies (in a loose sense) the expression "Cheeky Possum".

Early Naturalists' Writings – 4

Mallacoota Inlet

From the preface to the book "Wildlife in Australia", written by W. H. Dudley Le Souëf, we read—

In writing a short account of various excursions made to different parts of Australia, my object is to place on record a few facts about our fast disappearing fauna, and to interest others in the wonderful book of Nature and to stimulate them to learn for themselves how rich a storehouse of marvels it is, and how generously it rewards those who give it patient study.

Surely a message like that should inspire us to cease being apathetic or tentative about writing of the little things we observe; and as you read on, you will indeed notice that small observations are treated just as carefully as the more spectacular observations.

This, the fourth in the series, is taken from "Wildlife in Australia"; and in particular deals with Mallacoota Inlet.

Our party, consisting of Colonel C. S. Ryan, Dr. G. A. Syme, and the writer, proceeded by train and steamer to Cunningham, situated at the entrance to the Gippsland Lakes, arriving there about dusk. On the lakes large numbers of Black Swans were seen and on being approached too closely they, with outstretched wings pattered noisily over the water until they had gained sufficient momentum to enable them to rise. On the banks, especially where the rushes grew, Coots were plentiful. They often make rough platforms to stand on over the water, by breaking and bending over a few rushes one towards the other; and they frequently construct a floating nest of the same material in still

water, well hidden among the rushes. They are adepts at climbing by the aid of their long toes, getting over an ordinary wire netting fence without any difficulty; and when eating, a small lettuce for instance, a Coot will grasp it with one foot and lift it half way up to its beak, using its foot as a hand. Its beak is strong and sharp, and it often feeds on short green grass, putting its head on one side and so nipping it off.

Next morning we drove thirty-five miles to Orbost, a township situated on the Snowy River and about ten miles from its mouth.

When we stopped for lunch at a wayside public-house, I found on a shrub a bunch of sixteen cocoons belonging to a Death's Head spider. Some of them contained young and others eggs in various stages of development, the last one being hardly completed, showing that the eggs commence to develop as soon as the cocoon is finished. The average number of young spiders or eggs in each cocoon was 256, making a total of 4096; and it is quite possible that she had not quite finished her brood. Consequently these spiders must have many enemies, otherwise the country must be overrun with them. The spider herself sits on the cocoons, which are held together with strong cobweb, and has her legs compactly drawn up; and her back which is the most prominent part, is almost the same colour as the cocoons, namely brown. She can, therefore, remain in an exposed situation, being wonderfully protected by her colour.

We arrived at Orbost at 5 o'clock. The town is situated on the banks of the Snowy River, which we had imagined from its name to be a clear, pellucid stream; but we found on the contrary that this portion, at any rate, was very muddy. Every now and then a heavy flood comes down and submerges the river-flats, covering the soil in many places feet deep with sand. The soil of the river flats is very rich and splendid crops of maize and hemp are grown, the latter averaging about 12 feet in height; we were told that it grew a foot a week and that when ready it is cut, made into bundles, and steeped in water for about eight days, when it is dried and crushed to get rid of the bark and pith.

We left Orbost again at 6 o'clock, on horseback, a packhorse carrying our luggage, and reached Marlo, situated at the mouth of the river, at 10 o'clock. The view from this place was very fine, overlooking the valley of the Snowy River on one side and the open ocean and the river bar on the other. Early next morning a start was made for the Bemm River, a distance of 25 miles. On the way we passed over Cabbage-tree Creek, and, following it up for some distance, saw some specimens of the Cabbage-tree Palm, one of which was about 60 feet in height. It is curious that this is the only portion of Victoria where these Palms are found, although they grow in Eastern New South Wales. It is probable that the seeds were brought here by natives, or possibly by some other agency. The country we passed through was generally poor, with occasional low ridges of sand; and crossing one, we passed a dray laden with wattle bark drawn by sixteen bullocks.

Shortly after leaving Marlo, we passed close to the ocean beach; and on a shallow salt lagoon at the foot of

the cliffs, and separated from the ocean by a low sand bank, Musk Ducks, Black Ducks, and Grey Teal were enjoying themselves. The former were generally in small companies of seven, possibly the young with their parents.

In the neighbourhood of Bemm River, we were told that Dingoes were plentiful, but it is probable that few, if any, pure dogs exist. We saw a few Emus in the open country as well as Grey Kangaroos. In January, 1894, a heavy flood occurred in this river, which rose 30 feet above its ordinary level; and immense numbers of young birds must have been drowned in their nests, as the thick scrub on the banks is a favourite nesting place. But, as showing the devotion of some birds to their young at such times, my friend, Miss Hood, of "Merrang", Hexham, in Victoria, found the remains of a Black and White Fantail which had apparently been drowned while trying to protect a little brood from the flood water; and when the waters went down, her remains and those of the three young under her were found in the muddy nest. Another case, showing equal devotion, occurred in Gippsland, when during a dry summer, a bush fire devastated the country close by a farm, and on passing over the burnt land shortly after, the body of a dead hen was noticed, sitting on the ground, with most of the feathers scorched off her back, and on lifting her up, five little chickens a few days old, were found safe and sound; the mother could easily have escaped if she had left her little brood, but the maternal instinct was too strong and she died in protecting them.

We left next morning for the Cann River, 20 miles distant, and during the day noticed the Leach Black Cockatoos and saw the way they had partially stripped the bark off dead rung

trees, in their search for the grubs. We also saw Sulphur-crested Cockatoos, White Goshawks, and noticed one tall White gum tree on which both the nest of a White Goshawk and that of a Sparrow Hawk were situated, but they were perfectly safe as we couldn't climb the tree. Gang-gang Cockatoos, with their curious note, like a creaking gate, were occasionally seen in pairs, and in the dense scrub the clear call of the Coachwhip bird was heard, like the cracking of a whip. These birds seem very local, and one pair seldom stray far from one limited locality and almost invariably feed on the ground, scratching the surface like a domestic fowl; they are always in pairs and are seldom far apart. In the heath covered country the delicate little Emu-wrens were plentiful, always being found in flocks; and they seem continually on the move, dodging in and out of the thick vegetation or taking short flights from one bush to the other. Their dome-shaped nests are well hidden in some thick bush about two feet from the ground. In the same locality, among the long tussocky grass, glimpses were occasionally obtained of the dull-coloured little Grass-bird; and on the ground, which was comparatively free of undergrowth, the White-throated Nightjar would occasionally be disturbed, as well as the Ground Thrush; but they are so like the ground that if they only refrained from flying when one passed close by, they would probably never be noticed. Blue Wrens were of course plentiful, generally in small flocks of about four or five birds. They, too, keep close to the thick vegetation near the ground and are continually on the move. In the larger timber the curious note of the Leatherhead was often heard; these birds generally keep near the tops of the trees. Occasionally we passed near a flock of Bell Miners

busily searching for insects among the tree tops and frequently uttering their single tinkling note. It is curious how local these birds are and how close they keep to water. I remember on one occasion in Gippsland what a welcome sound the note of the Bell Miner was, as we were passing over a long dry stage, when, hearing these lively birds, we at once knew that water was somewhere near. They almost invariably live in communities. Many other birds were seen, such as King and Pennant Parrots or Scarlet Lowrys, Honeyeaters, Flame-breasted Robins, &c., &c.

We stayed for the night at the Accommodation house on the Cann River, a distance of 35 miles. This country is very heavily timbered and it is only along the rivers that the trees have been cleared and the land cultivated; consequently sheep are seldom seen, but goats which can live well on shrubs, often take their place as an article of food. On one occasion, while unsaddling our horses at a house we were going to stay at for the night, I noticed a fresh scalp of a kid lying on the ground and casually remarked to one of our party that I wouldn't be surprised if we had kid for supper. Well, later on, when that meal was brought in, there was a plentiful supply of mutton, as our hosts called it, but the third member of our party who did not know anything about the aforementioned scalp, thought it really was mutton and kept explaining "fancy seeing mutton here, we have not seen country that could support a sheep for the past two days, where do you keep them and what do they live on? &c., &c. Kicking our friend under the table to restrain him and so lessen the confusion of our hosts had no other effect than making him want to know what we were doing it for; anyhow the kid was very tender and thoroughly appreciated by us.

The road to Genoa was very interesting, although for the most part only a rough and newly cut track, which in some places went down a steep hillside and up again at the other side at an equally acute angle. On one occasion when toiling up a steep bit of road leading our horses, we met a Copperhead snake rapidly coming down the track; it was too late to stop when it saw us, so passing quickly between my feet it soon disappeared. On another occasion, we espied a Tiger snake and as I wished to examine it, to see whether there were any ticks on it or not, I got off my horse which one of my companions held for me. Going up to the snake I quickly put my foot on it, but not with sufficient pressure to do any damage; and working my foot up to its neck, I was then enabled to grasp the reptile there, not giving it room to turn round and bite me. Lifting it up I was then able to examine it leisurely, although it wriggled about a good deal. After I had removed the ticks and thrown away the snake, we proceeded on our journey. Now the track lay over a hill of granite, then again over another hill of slate and quartz and so on. Splendid forests of ironbark and other trees were passed through, and Tree ferns were plentiful in the deep gullies; and we heard the clear call of the Lyre bird on several occasions in such localities, while every now and again we had beautiful glimpses of distant views from our mountainous track, as it wound along the crests of the hills; occasionally we passed over swampy ground, on which grew stunted trees. Funereal Black Cockatoos were seen or heard on several occasions among the tall trees, and one Copperhead snake was caught and despatched; but as the weather was hot, we had expected to see more of these reptiles. Lizards

were numerous, two so-called Iguanas or Gould Monitors were noticed, and it is astonishing the speed at which they run up the trees, always carefully keeping the trunk between the intruder and themselves, and it is almost impossible for a person by himself to get a shot at one. I lately knew of a man who attempted to drive over one of these reptiles, but it ran up one of the forelegs of his horse and got on its back; the animal became unmanageable from fright, promptly bolted, and soon overturned the conveyance by coming in contact with a tree. The Iguana was thrown off by the jerk of the concussion and escaped up the tree.

An interesting note about an Iguana appeared in the "Argus" by Mr. John Hopcraft, of Red Hill, Victoria, in which he stated that he saw one of these reptiles that had captured a large hare and was holding on to its ribs. The Iguana by a series of jerky snaps continued the assault, each jerk getting a fresh hold slightly nearer the head. It was not till he had got on the neck that the hare was quickly killed. The Iguana now moved round and placed himself in a line head to head with the hare. Opening his jaws, the reptile got the hare's nose in his mouth; then by jerky movements, the head began to disappear and the shoulders became fast wedged in the Iguana's throat. Still slowly, very slowly, the attempt to swallow went on, and the hare gradually disappeared, and in fifteen minutes only the hind legs were outwardly visible. He approached the reptile, which was quite unable to move away, only able to jerk, jerk, jerk, getting his dinner down. Soon, nothing was to be seen of the hare, only the monstrous enlargement of the conqueror, and then the Iguana was no longer helpless and quite actively ascended to the top of a stubb fence, where he left him.

The tracks of the so-called Porcupine Ant-eater or *Echidna* were seen on several occasions across the dusty track, and also the holes they had burrowed into the White Ants or Termites' mounds, these insects being their favourite food.

Near the house at the Cann River was a large blackberry hedge, which was in full bearing at the time of our visit. Numbers of Grey Crow-shrikes came to eat the fruit, and I watched a little Collared Sparrow-hawk, which was sitting on a neighbouring willow tree, suddenly swoop down and fly along the hedge on one side and return to his seat on the willow along the other side of the hedge, disturbing and driving away all the Crow-shrikes that were busily engaged feeding. Occasionally one was struck by the passing hawk and the one so struck called out loudly in its fright, yet it was much larger than the hawk. He seemed to disturb them for amusement only, as I watched him doing it several times, and it was evidently not for the purpose of procuring food. I have seen the Australian Goshawk do the same thing with Nankeen Herons. It will fly at them as they are seated on a branch and send them spinning down to the ground, although often the Heron will not wait for the Hawk to reach him, but promptly plumps on to the ground; and again, if a Goshawk sees these birds flying overhead, it will often apparently amuse itself by flying at them and occasionally striking them with its talons as it passes by and pulling a few feathers out. In any case, the Heron is thoroughly frightened and squawks out loudly as it tries to get to the ground, apparently feeling safer on terra firma. The late General Watson of North-down, Tasmania, told me that he once saw a little Falcon strike a swiftly flying Duck, which then fell dead into the water. The Falcon flew down and

alighting on the floating bird, commenced to devour it.

A beautiful nest of the Flame-breasted Robin was noticed, snugly built between the interstices of a rough piece of bark of a *Eucalyptus* tree.

We arrived at the Accommodation House at Merrimong on the Genoa River at sundown and turned our horses out, as the rest of the journey was to be by boat. On the river flats were heavy crops of maize, and when nearly ripe store pigs were turned into them, where they rapidly became fat, rooting up the maize plants and feeding on the corn. The pigs were sent to Twofold Bay about 60 miles distant, to be shipped to market. It was easier to drive the fat pigs than cart the corn over the heavy roads. Black, Tiger, and Copperhead snakes are found here, and Water Lizards were often seen lying basking in the sun on the rocks or logs by the water's edge; but directly they are disturbed, they dive into the water and are consequently difficult to capture alive. In the river, Eels are plentiful and we were informed of some having been caught weighing 28 lbs. If set nets are used, many of the fish caught are eaten before the morning, and our friend, Mr. Allan, said Eels were the culprits. On one occasion he had seen a Water Lizard partly disabled, jump into the water and while it was swimming on the surface, a large Eel seized it and dragged it down, and it did not reappear. Personally I think the Golden-bellied Water-rats are largely responsible for eating the fish caught in the set nets. *Platypi** were also numerous, and one large specimen was caught in a net during our visit, but escaped from captivity during the night, for these creatures are very strong and are adepts at climbing. *Echidnas* or so-called Porcupine Ant-eaters are equally as proficient in the same art. We were informed that the

* *Platypuses* of course is the accepted plural now.

Platypi are generally caught here in the nets and as far down the river as Gipsy Point, where the water is nearly salt, while in times of flood, they went down the river to the Upper Malla-coota Inlet in fresh water. When the river returned to its normal condition they have been caught there in the salt water and they were plentiful enough where the water was brackish.

We left next morning by boat for Malla-coota Inlet, a distance of 25 miles down the Genoa River. The stream for the first few miles is narrow, at places partially obstructed by fallen timber, but as we got further down, it widened out considerably and gradually became brackish as it neared the Upper Malla-coota Inlet. When being rowed down the river, we occasionally disturbed numbers of Black Ducks, and we passed a colony of the Little Black Cormorants resting over the water on the branches of an old dead tree that had fallen into the river. Some Welcome Swallows were noticed high in the air, chasing a Hawk, when the latter bird took a rapid dive almost in a perpendicular line towards the earth and alighted on a tree near the river. We also found several of the mud nests of these Swallows built in small hollows of the branches of dead trees that had fallen in the river, and often within a few inches of the water. So that should a flood occur during the nesting season some nests unavoidably get swamped. A pair of Ospreys watched us as we passed by, and further on we saw a pair of the fine White-bellied Sea Eagle, which let us pass comparatively near them. A few Nankeen Herons were also seen as well as Cormorants. In the salt water we trailed a fishing line behind the boat and caught a few Skipjack. The bait was a piece of red rag and bit of tinsel fastened on to the hook. About midday we camped for a short time on the shore, and making

a fire, soon had the fish we had caught cooked, and they made a welcome addition to our lunch. The Upper Inlet is about three miles long and two broad and is connected with the lower by a passage about a mile in length, with fairly high land on each side. On passing through this we came to Malla-coota Inlet itself, which is about seven miles long by four wide.

We had often heard of its beauties, but they far exceeded our expectations. The water is salt and very clear, and the banks covered with vegetation to the water's edge. Many of the gullies that ran down to the Inlet were clothed with thick scrub, often festooned and matted together with creepers whose dense shade afforded a cool retreat for the birds. There are various arms running inland some distance and the coast line is very broken, making numerous little bays, some with sand beaches, others with rock or gravel. Quartz reefs are to be seen in places on some of the steep banks and some of these have been worked and proved to be gold bearing. The clear waters teem with fish of various kinds, Mullet, Skipjack, Schnapper and Flat-head being especially plentiful. A specimen of the latter was caught during our stay that weighed 14 lb. Sting-rays are also numerous and are often seen in the shallow estuaries, but they are a timid fish. On the shore the Brush-tailed and Red-bellied Wallaby are abundant, and Grey Kangaroos are occasionally seen. Wonga-Wonga and Bronze-wing Pigeons were heard in many places. Some parts of the Inlet are shallow and at low water sand banks are left exposed here and there on which are generally to be seen Black Swans, Ducks, Gulls, &c.

Near the bar are several islands of various sizes, the favourite haunt of the Spur-winged Plovers and White-fronted Herons. The bar has a high cliff on one side and a long range of

low sandhills on the other. The depth of water at low tide is about 9 ft., and small steamers and schooners can go in and out except in rough weather. In many places on the coast, what are apparently old sand dunes, are now some distance inland and covered with trees and scrub.

We stayed at the hotel that night and spent next day in exploring its neighbourhood. In one of the gullies we heard a Lyre bird on its slight mound, mimicking the various birds of the bush, even the Laughing Jack-ass, the Grey Crow-shrike, Gang-gang Cockatoo, &c. But what struck us as most curious was its imitating the whining and yelping of a puppy; and we afterwards heard that some miners who were camped near by, used to leave a puppy fastened up at their tent while they were away. We also heard the bird uttering a note something like the sound produced by a cross-cut saw, and as one had worked in the neighbourhood, that is probably what it was; it only shows what wonderful power of mimicry these interesting birds have.

We frequently heard the Satin Bower-birds in the dense scrub and were fortunate in finding one of their bowers built in a pretty situation and surrounded with ferns. These birds when in their greenish costume are far from shy, but when the males don their beautiful dark blue satin livery in their seventh year, they at once seem to realise that they are conspicuous and always keep as much out of sight as possible; but for all that they evidently soon fall a prey to the watchful Hawk, as it is a rare thing to see more than one blue male in a flock of these birds. It is curious watching their antics as they are playing round their bower, hopping about with mincing steps and drooping their wings at the same time, picking up sticks or shells and dropping them

again in front of one another, and at the same time uttering a low running note. They are also very clever at mimicking other birds. They are fond of green food and soon clear all the grass off any aviary they may be placed in, and frequently the leaves off the bushes too. They often pull their bowers to pieces to erect them elsewhere. Not far from where we found the "Bower" the Tree ferns grew very thickly, forming a dense shade, and close by, on some open swampy ground, grew some Grass trees, whose single flower stalks, covered with small white flowers, were in some instances 8 ft. long, and as the flowers were literally dropping with honey, which could be shaken off if the stalk was bent over, it was a capital place for catching flies, butterflies, beetles, ants, wasps, &c., as they were sipping the delicious nectar. In the evening after having dined on Soles and other fish, we sat by the Inlet and were impressed by the number of fish that rose to the surface of the still waters; the clicking sound made by them seemed almost continuous. Now and again, a Golden-bellied Water-rat would pop into the water on detecting our presence. We had noticed feeding places of these animals during the day on some favourite log lying in the water close to the bank where were the remains of fish, mussel shells, and crayfish.

The next day, after inspecting a gold mine, we returned by boat to Genoa; and leaving there early next morning on horseback, passed along the same route by which we had come. But in some places the path was difficult to follow, as a bush fire had passed over a portion of it, burning the timber and bringing many trees down across the track. We camped for lunch at Coolwater Creek, a clear stream at the bottom of a deeply

shaded gully, and as usual led our horses to the top of the ridge before mounting. We reached the Accommodation House at the Cann River by sundown. The day following we rode to the Bemm River for lunch; and after an hour's rest, went on to Orbost, where we arrived at 8 o'clock. The man we had with us to look after the horses and act as guide told us that he had an exciting adventure with a Tiger snake a short time previously, as just before getting into bed he noticed that a snake had already taken possession of his bunk. So hastily dressing again, he got a stick and went for the snake but in the uncertain light of a candle, and the numerous impedimenta about the room, the snake evidently got away down a hole in the floor. Anyhow our guide thought it wiser to leave the snake in possession and he slept elsewhere that night. We arrived in Melbourne next day by steamer and train after having had a most enjoyable trip.

I was enabled to visit this beautiful Inlet on a subsequent occasion in the G.S.S. "Lady Loch". When opposite the bar we were landed in one of the ship's surf boats, and after remaining a little over a day, the steamer, which had been leaving stores at the Lighthouse on Gabo Island, called for us again, the boat being rowed into the Inlet to take us out to the steamer. The nearest port to Mallacoota is Eden, situated at Twofold Bay in N.S.W., and it is only a day's journey on horseback. It is a fine spacious harbour, where vessels of any size can come in. Whaling has been carried on here more or less ever since 1839. An interesting article on this subject appeared in the "Argus" in November, 1905, by Dr. Alex. Lewers. He states:

"For the present Eden responds to one excitement only. At the cry of 'A whale in the Bay' the whole population hurries to every available point

of vantage, and watches for the capture with as much eagerness as though each individual had a personal interest in the profits. Why whales should seek Twofold Bay is not quite clear, but local opinion is firm in the belief that they do so under compulsion rather than from choice. About this part of the coast lurks a species of sea monster locally known as a 'killer' which is apparently something in the nature of a Grampus. It is firmly held that the 'killers' work in conjunction with the whaling boats and drive the whale in designedly, much as a sheep dog rounds stock up into a yard. Many and fearsome are the legends of sagacity displayed by these 'killers', and it is alleged that on one occasion a 'killer' appeared in front of a Whaling Station and displayed such evident agitation that the boats put out and were led to a whale outside the harbour. However this may be, the 'killers' are held almost sacred, and are even known to the whalers by name. One marked by a white band is affectionately called 'Stripey' while another with a broken fin goes by the appellation of 'Hookey'. Once a whale is sighted it is the property of anyone who first makes fast; but in practice the operations are conducted by one proprietor.

"During the season, which extends from June to October, two boats' crews are provided with clothing and rations and a certain percentage of profits in the event of a capture. These crews are composed almost entirely of aboriginals, who have been specially trained to the work from childhood. When a whale appears, signal fires are at once lighted and the boats turn out almost with the celerity of a metropolitan fire brigade. Each boat carries a crew of six men. The first is equipped with harpoons, lances and tackle, while the second is known as the 'Pick-up' and stands by in case of accident to rescue their comrades.

With a skilful cast of the harpoon, the leading boat makes fast to the whale and then begins a time of excitement for the onlookers, and of danger for the whalers. The unfortunate whale, worried on every side by four or five 'killers', and stung to mad agony by the wounds of the harpoons, tries by every means in his power to shake off the deadly pursuit. If the whale is still able to go forward with any pace, the boat's crew are in imminent danger of being swamped, but the 'killers' seem quite alive to the necessity of hampering his course, and one or two of them keep continually in front, and compel the victim to travel slowly. This enables the boat to get up from time to time, and make effective play with the lances, and soon the life-blood is pouring from a dozen wounds, and dyeing the water a deep crimson for yards around. This is perilous work for the boat while the great monster lashes the water into seething foam, and dives, perhaps to rise again right under her keel. One blow from a fin would splinter the craft into match-wood, and coolness and daring alone save its occupants from disaster.

"Slowly the procession moves up the harbour: the great carcase of the whale, now looming above the water and again lost to view, the smaller forms of the killers' grow more and more active, and work always in front; and the two boats with their crews alert for every danger, and watching every opportunity to deal another lance-thrust and make assurance doubly sure. Suddenly the whale turns, and makes out to sea again. The spectators hold their breath, and count the minutes. If the boat can hold on for an hour from the strike, the end is certain, and anxiously the remaining chances are measured. The pace gets slower and slower. Every time the whale rises now, great volumes of blood pour out on every

side, making the very ocean red. The 'killers' first on one side, then on the other, harass him at closer quarters. Then in a final death agony the huge monster thrashes the water into a wild tumult of bloodstained foam and the chase is over. The captors divide the spoil. For twenty-four hours the 'killers' have the carcase under the surface and feed upon it. When they have taken their fill the huge form, in which decomposition has already begun, floats up again, to be held by the anchor which the whalers have previously affixed. It is then towed across to the station and the work of extracting the oil and whalebone is all that remains. Yet not quite all, for the carcase of a dead whale at Eden is put to medical use in nearly every case before being dismembered.

"There is a local tradition that a cure for rheumatism may be effected by placing the patient bodily into the still warm blubber. A small hole is cut in the outer skin, and through this the sufferer, clad only in nature's garb, works his way down until only his head and shoulders remain to the outer world. Here he sojourns for an hour or more, or until he becomes faint, when he is withdrawn, and restored to the world once more. It is very rarely that a catch takes place without a patient appearing ready and eager to undergo this curious treatment, which is the only evidence as to its efficacy that is forthcoming. That it actually occurs can be truthfully attested. We interviewed a hopeful sufferer both before and after the ordeal; he was a man well over sixty years of age, and seemed, at all events, none the worse for his experience.

"The business of whaling, like most dangerous callings, is a profitable one in a good season; there are two varieties, the 'Right' whale and the 'Hump-backed'. Great is the disappointment when the catch proves to be a 'Hump',

for it yields but little oil and is altogether of small value in comparison with the larger species. During the present year five whales have been taken to Eden, and two of them, caught in the one week, yielded a joint profit of £1500. In 1905, ten whales were taken, yielding 25½ tons of oil and 1½ cwt. of bone."

On leaving Mallacoota, Cape Howe gradually faded in the distance; it was named by Captain Cook after Lord Howe, R.N., and we soon came in sight of Ram Head, so named by the same Captain from its resemblance to Ram Head, at the entrance of Plymouth Sound, England. While passing along this portion of the coast, our thoughts go back to the time, when on April 19th, 1770, over 130 years ago, Captain Cook arrived here in his barque the "Endeavour" and first saw the coast of Australia. Authorities differ as to his first landfall, but it was most probably the coast between Ram Head and Cape Everard. On this point a lighthouse has been erected, and its keepers complain about the number of snakes that pay them a visit. A stone wall seems to be the favourite place of refuge for these reptiles, and we were shown the blackened powder marks where some had been shot at close quarters. On leaving here we passed along the Ninety Mile beach to Port Albert, and as the sea was rough on this occasion, a difficulty was experienced in landing. The small steam launch that took us to the shore broke down just before reaching it; and we found there were neither oars nor anchor on board, so that the strong tide began to take us rapidly out to sea again. Thanks, however to some flooring boards among the cargo, we managed with difficulty to row into shallow water and so reach the land.

Leaving here we went on to Clifty Island, on which was a lighthouse. It

is seventeen miles from Wilson's Promontory, to which place signals are made by means of flags in clear weather, and 167 miles from Melbourne. It is a difficult place to land stores on, in anything like rough weather, and the usual crane is erected for that purpose. A few years ago this island was thickly clothed with tussocky grass, but now not a plant is to be found; the mesembryanthemum or pig-faced weed is also disappearing, being eaten close down by goats and rabbits. As the surface soil is being disturbed, the strong winds are rapidly blowing it away. Soon there will be nothing but bare granite rock. The lighthouse-keepers told us that shortly before our visit, during a storm, the heavy spray from the breaking surf was blowing right over the houses, 130 feet above sea level, and everything was drenched with salt water, showing with what force the waves break against this exposed rock. There is a large crack on one side of the island, where one part has apparently sunk to a lower level and separating, has left a cleft, into which the sea penetrates for some short distance.

The next place called at is Wilson's Promontory, named by Governor Hunter at the request of Flinders, and also called South Cape by the intrepid Dr. Bass, when on his voyage of discovery from Sydney to Westernport. He was the first navigator to ascertain the real existence of the Strait separating Australia from Tasmania, which was deservedly called after its discoverer.

On leaving Wilson's Promontory we passed Rodondo Island, named by Lieutenant Grant from its resemblance to a rock of that name in the West Indies. In the distance can be seen Curtis Island, so called by the same discoverer, which from its likeness to Lion's Mount at the Cape of Good Hope, he named after the Commander

of that station, Sir Roger Curtis. Not far from it was the rugged rock, also named by him The Devil's Tower. Glennie Islands then come in sight, called after a Mr. George Glennie, a friend of Lieutenant Grant and Captain Schanck. Steaming past Waratah Bay the vessel was soon abreast of Cape Liptrap, named by Grant after a friend of his, John Liptrap, of London. Cape Patterson is next passed, called after Colonel Patterson of the then N.S.W. corps.

Westernport, so named by Bass, is now seen, and here it was that Grant remained for some time, forming a garden on Churchill Island, which he called after John Churchill, of Dawlish, England, the gentleman who partly supplied him with the seeds he sowed. The Seal rocks off Philip Island also received their name from Grant, as when he saw them, they were covered with Sea Elephants. Sandy Point in Westernport was named by him Lady Nelson Point, after his ship, and it is a great pity that the name has been changed. Cape Schanck is soon abreast, and shortly after the ocean or back beach of Sorrento is passed, just before Port Phillip is reached.

It was near the ocean beach at Sorrento that Mr. T. W. Fowler found interesting fossil remains of an extinct

species of Kangaroo in the dune sandstone namely *Palorchestes*. It was near the outer edge of the reef and is only exposed at low water, the white bones standing out clearly in the dark rock. I was only able to photograph it with about an inch of water flowing over it, as there being a high wind, the tide did not go out sufficiently to leave it dry.

On the piles of the piers in Port Phillip mussels are very plentiful, but are apparently kept down to a great extent by the shell fish *Purpura succincta*, which feeds on them. The *Purpura* shells grow to a fairly large size but are not easily detected on account of the seaweed and other marine vegetation growing on them. The largest mussels seem to be attacked the first and the *Purpura* remains there until it has completely devoured the occupant, leaving the empty shell hanging loose by the byssus to the pile.

I often noticed how often in summer Swallows may be seen flying over the Bay near the shore after their insect prey; and on a cold windy day, I counted over one hundred and fifty of these dear little birds sunning themselves on the sheltered side of the Sorrento baths. They sat in long rows, closely packed together and only a short distance above the water.

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary. Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

Accelerated Tree Death in Mature *Nothofagus cunninghamii* Oerst Forests in Tasmania

by TRUDA M. HOWARD*

Summary

In North West Tasmania, the normal pattern of sporadic tree death in mature *Nothofagus cunninghamii* stands has been replaced by the death of large groups of trees. This tree death was seen to occur in late summer to early autumn. Sections of newly dead trees showed thousands of new tunnels of *Platypus* sp. beetles and soon after cutting developed a mycelial felt. It is inferred that this fungus is carried from tree to tree by *Platypus* beetles, often killing the host tree, whilst feeding the *Platypus* larvae. A parallel is drawn to Elm die-back disease.

Tree Death in the Mature Stand

In a mature undisturbed *Nothofagus cunninghamii* closed forest, the death of individual trees causes a gap in the forest canopy, which, in time is occupied by seedlings, then saplings of *Nothofagus cunninghamii* and *Atherosperma moschatum*, or of any other of the less common rainforest trees, which are present in the stand. In such a stand, the maximum trunk diameter classes of *Nothofagus cunninghamii* for that altitudinal zone, are heavily represented, trunks of smaller diameter are few and scattered over a wide range of size classes. In Victoria, where *Nothofagus cunninghamii* forests are few (Howard and Ashton, 1973), only one or two (particularly in the Strzelecki and Otway Ranges) are sufficiently mature to have achieved this structure. In Tasmania, where *Nothofagus cunninghamii* is widespread, a great deal of the area is occupied by mature forests with this type of structure.

In the Surrey Hills area of North

West Tasmanian, observations of large areas of both disturbed and undisturbed forest have revealed a considerable departure from the normal pattern of tree death, and consequently, in the structure of the forest. In undisturbed forest, the death of a single tree is often followed year by year, with the death of surrounding trees, of all ages and sizes (excluding poles and saplings with a diameter of less than 6 inches). Following disturbances, typically by cull felling, or access road construction, which create large gaps in the canopy, rapid and widespread deaths occur of a large number of trees.

Investigation into the Causes of Accelerated Tree Death

Various approaches to the problem of accelerated tree death were tried. Initially, the effect of root damage (by trenching) was tested as a possible cause of accelerated tree death in disturbed areas. Thus in the undisturbed forest trees with more than half of their roots severed appeared to suffer no ill effects during the 1971-72 summer. However, some trees on the edges of new roads and snig tracks which had had their root systems trenched, did die. Sample discs were collected from along the whole length of the trunk, and inspected in detail in the laboratory. The sections from the lower parts of the trees showed thousands of small holes (1-2 mm in diameter) through the bark, just penetrating the outer layers of the wood, and the majority of the cambium was dead and brown.

Immediately after this discovery in

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February 1972, a tree showing symptoms of incipient death (drooping foliage and excessive leaf drop) was found in the undisturbed forest. The surface of the bark was covered with sawdust expelled from abundant insect tunnels. Within three weeks of the initial observation of insect activity, this tree was dead. The tree was immediately felled and the infested area sectioned. The sections showed that each hole extended approximately 3 cm into the wood, and was occupied by an Ambrosia beetle (*Platypus* sp. Fam. PLATYPODINAE).

The mechanical damage caused by the insect tunnels was clearly inadequate to have been responsible for tree death. Within two days of cutting the sections, extensive fungal development was apparent on the section surfaces. This raised the possibility that tree death may have been caused by a pathogen introduced by the beetle, a possibility strengthened by the knowledge that the family contains species known to cultivate fungi with which to feed their larvae.

Trees which were known to have died during the 1970-71 summer were sectioned, and found to contain major radial tunnels extending from the point of entry to the heart of the tree, with a series of branch tunnels at right angles, each containing a larva and lined with a mycelial felt. The larvae were free to move within these tunnels. As with the freshly dead material, these section faces rapidly developed a similar extensive mycelial cover on the cut surfaces.

Discussion

The observations on the probable link between a fungus (species as yet unknown), a probable insect vector (*Platypus* sp.) and the death of a forest tree (*Nothofagus cunninghamii*) suggest a relationship similar to that of *Amylostereum* and *Sirex noctilio* to *Pinus radiata* death, and of

Ceratocystis ulmi and *Scolytus* spp. to Elm dieback.

An attempt was made to establish that the fungal material lining the *Platypus* sp. tunnels was indeed pathogenic, but although trees into which the fungus was introduced (through small holes drilled into the wood) showed symptoms of incipient death (wilting and excessive leaf drop) within a fortnight of infection, all recovered after another three weeks. It seems very likely however, that *Platypus* sp. is acting as a vector for a pathogenic fungus, as such a relationship has been established between *Platypus* spp., a fungus and damage to and/or death of four New Zealand *Nothofagus* species (Milligan, 1972).

Further Observations on the Relationship Between *Platypus* and *Nothofagus cunninghamii*

In the Surrey Hills district of N.W. Tasmania, *Platypus* attack, and subsequent tree death appears to be restricted to late summer and early autumn. Most sawdust expelling activity by the adult *Platypus* beetles appears to be over by late May.

The spread of *Platypus* within the mature forest, from an already infected tree, seems in a majority of cases to be a matter of spreading to the nearest tree. Within the mature *Nothofagus cunninghamii* forest on Surrey Hills, extensive areas of dead trees have been studied. In many cases these areas of dead trees are still enlarging annually through the spread of the *Platypus* borne pathogen. It is possible to trace evidence of past *Platypus* attack on all but the most decayed of these dead trees.

Within such areas of dead trees young *Nothofagus cunninghamii* and *Athosperma moschatum* trees are regenerating successfully. Milligan (1972) has observed that N.Z. species of *Nothofagus* appear to have a minimum size under which *Platypus* at-

tack is not successful. That these young trees have not succumbed to *Platypus* attack may likewise be due to effective wound response in the young trees. However, extensive sampling of young *Nothofagus* saplings and poles has not revealed the formation of "pathological wood" such as reported for N.Z. *Nothofagus* species (Milligan, 1972). It seems likely that the young *Nothofagus cunninghamii* trees may not be attacked at all by *Platypus*, and that this may be due to their leafy crowns forming a shield for the trunk right to ground level.

Accelerated *Platypus* attack and death appears to occur after logging or roading of a *Nothofagus cunninghamii* stand. Not only are entire living trees attacked, but also stumps which are still alive after the falling. From some stumps, before *Platypus* attack occurred, coppice growth had been produced; this was killed and no subsequent coppicing took place from this or any other *Platypus*-killed tree, suggesting that the entire root system, as well as the trunk and crown of the tree is affected by the fungal pathogen.

Although *Platypus* beetles attack in immense numbers (up to 1000 holes/sq. m. have been counted), the attack is often restricted to one side of a tree (nearest a source of infection) and generally occurs only in the lower 15-20 ft. of the trunk. Exposed roots are usually also heavily infected, though many are of insufficient diameter to support the fully developed tunnel pattern.

The Extent of *Platypus* Infestation in Australian *Nothofagus* Species

To date, *Platypus* infestation has only been observed in *Nothofagus cunninghamii* in North West and Western Tasmania. *Nothofagus gunnii* has not been investigated for *Platypus* infestation.

In Victoria, no evidence of *Platypus*

infestation was ever found by the author during a four-year study of *Nothofagus cunninghamii* all over that State. It had been present, the cycle of regeneration through coppice formation described by the author (Howard 1973) would have been unlikely to occur, and the status of the species would be even more precarious than it is today.

In N.S.W., where the author has so far inspected stands of *Nothofagus moorei* in two areas (Mt. Boss State Forest, inland from Wauchope, and the Tweed and MacPherson Ranges on the border of N.S.W. and Queensland) no evidence of *Platypus* infestation has been found.

If indeed *Platypus* species are quite indiscriminate in the species of *Nothofagus* which they attack (as reported for the three *Platypus* and four *Nothofagus* species in N.Z. (Milligan, 1972)), this is an insect vector and pathogen which should be carefully excluded from the restricted *Nothofagus* forests of mainland Australia.

Acknowledgement

This work was carried out while the author was employed by Associated Forest Holdings Pty. Ltd., Burnie, Tasmania. I would like to extend my thanks to all members of the company who assisted in this project, but particularly to Mr. Dirk de Boer, whose enthusiasm and long experience with *Sirex* problems acted as a catalyst to this discovery.

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Phascogales Galore

by G. PIPER

Residents of a modern brick house in Kinglake described to me an invasion of their home by phascogales during the winter this year; a behaviour of which I had not heard previously, and I think this account may be of interest also to other members and readers.

These small marsupial mice entered the house by routes which no one would have suspected. Small entrances used, were in the eaves, floors and ceiling. They left evidence of interest throughout the house in the form of droppings; the shifting of small objects; and missing or well-chewed fruit. The work bench in the kitchen contained plenty of droppings left during the night, even though no food was left there. Fruit mysteriously disappeared from the bowl on the table, and solution did not come until half eaten passionfruit were found on the floor behind the heat bank. The latter region was the repository for various other small objects such as biro pens. How these were moved from the shelf or table, down and along the floor and around behind the heat bank was never observed.

The phascogales usually were active only at night, as is their custom; but their timidity did not prevent their appearing in the rooms while adults were still there. While people sat there they would scurry across the floor or around the margins of the room, and climb straight up the brick wall. Apparently neither the noise of conversation nor the TV was too inhibiting.

The residents trapped one in a live capture cage, and it was identified by the National Museum as *Antechinus*

swainsonii, commonly called the Dusky Marsupial Mouse. A photo of this species appeared on the cover of the *Victorian Naturalist* for September this year, and shows the long foreclaws, the sharply tapered snout, the small ears and the dark-coloured fur. It is a rich dark brown with some coppery tint. The tail is shorter than the body. Troughton in "Furred Animals of Australia" 9th ed. gives the head-body length of males as about 5½ inches, the tail length of about 4 inches. Females are smaller. A detailed measurement analysis for Australian mainland and Tasmanian populations may be found in the article "Some Revision in *Antechinus* (Marsupialia) — 1", N. S. Wakefield and R. M. Warneke, *Victorian Naturalist* **80**, 194-219. This article also has drawings of the plantar aspects of the feet, of interest in view of the reported ability of these animals to climb up a wall.

Distribution of this animal is given in this article as Otway Ranges, east central mountains, which contain wet sclerophyll habitats, also in a *Pinus radiata* plantation in Loch Valley in Gippsland and, as well, there are scattered occurrences in eastern and western Victoria (e.g., the Grampians). The appearance in southern Victoria could be another one of these odd occurrences.

Removal of these animals from the house was attempted by putting out one live capture cage each night, and next morning, carrying the animal out into the forest to release it. Unfortunately, the number of invaders was too

large for removal permanently by this means, and complete blockage of entrances had to be effected.

A nest was found under the refrigerator, lined with packing from it, and containing bottle tops. It was not

a phascogale nest but that of another animal described as a beautiful, creamy-coloured rat with big brown eyes, white abdomen and white ears. This animal was not identified but released in the forest.

Prehistoric Wildfires in S.E. Australia

by EDMUND D. GILL

Bushfires are a part of Australian life; they are a natural hazard on this continent. Before Europeans came, Aborigines used fires to oust game. Before any people lived in Australia, there were wildfires naturally caused, such as by lightning and by spontaneous combustion. That they have occurred in Victoria in the Cainozoic Era at least is shown by geological and biological evidence. The geological evidence consists of the products of fire in a stratified sequence of dated rocks. The biological evidence consists of plants adapted to bushfires. For example, *Eucalyptus regnans*, the Mountain Ash, is adapted in its regeneration and growth to the bushfire situation. *Hakea* seeds are released when fire or injury breaks the capsule.

Tertiary Fires in Brown Coal

Evidence of these is found in the Latrobe Valley brown coal field in Gippsland, Victoria. Gloe (1960) has described numerous depressions in the top of coal seams, that were later infilled with clay. They are irregular in shape but usually steep-sided. That they were caused by fire is shown by the thick layer of charcoal at the base (up to 4.6 m), and sometimes clay baked into a brick-like material. That the age of the fires is Tertiary is shown by the fact that they burnt Oligocene and Miocene coals, yet were overlain

by clay and the Pliocene Haunted Hill Gravels. The volume of coal burnt is considerable, being calculated for one of the deeper holes as $18.3 \times 10^6 \text{ m}^3$ (2,400,000 cu yd.).

Gloe (1960) has published a photograph (Fig. 22) of a huge hole in the coal surface at the Morwell Open Cut. The burned-out zone was subsequently filled with clays, the uppermost of which were black ligneous clays 3 m thick carrying impressions of eucalypt leaves. Such clays are of the same stillwater facies as the coals themselves. This is shown also by the fine bedding sometimes present. The clays contrast in facies with the high-energy Haunted Hill Gravels that unconformably overlie them. So the facies of the clays links them with the ecologic phase of coal deposition and not with the gravels which are apparently the result of the Kosciusko Uplift that rejuvenated the rivers of the Pliocene.

More recently, Waldman and Handby (1968) have recorded from the Morwell 1^a coal seam a depression from fire measuring about 67 m wide and 6 m deep. The infilling clay contained fossil fish, ostracods (in great numbers), sponge spicules, diatoms and pollen grains.

Prehistoric Fire in Mesozoic Coal

Parts of the Upper Coal Seam in the North Basin of the Leigh Creek Coalfield have been naturally burnt.

The coal is a sub-bituminous one of Upper Triassic to Lower Jurassic age. Fused coal ash resembling clinker was formed, and some of the adjacent shales were baked red. Dr. G. Baker (1953) made a detailed study of the fired materials. He quotes similar occurrences in New Zealand and U.S.A. The Leigh Creek fires are attributed to spontaneous combustion. The fire appeared to start near the surface and burn down, possibly indicating the height of the water table that long time ago is indicated.

Pleistocene Wildfires

The sea cliffs at Warrnambool in Western Victoria consist of dune-rock (aeolianite). The section at Thunder Point shows a prominent fossil soil up to 1 m thick. It is a terra rossa which includes many pieces of charcoal and occasional shells of fossil snails. The age of this rock is probably Last Interglacial (about 125,000 years ago) so it is nearly 100,000 years older than the oldest known Aboriginal site. It is therefore believed that the charcoal is a product of a natural bushfire.

Further inland, there are still older dunes which also have fossil soils, sometimes with charcoal. This is evidence of much older bushfires.

Bushfires of the Past 10,000 years

When space travel was being developed, space scientists in U.S.A. took a great interest in australites because they had come through the atmosphere at extremely high speed, suffering anterior melting as a result. One thing they wanted to know was when these australites fell, so an archaeological type dig was organized to find australites in place and date them (Gill 1965).

During the detailed work of this dig, when the superficial deposits on a ridge were carefully removed inch by inch and sieved, rings of grasstree

(*Xanthorrhoea*) resin were discovered. They were at a level to which the land had been deflated during a slightly drier time. Bushfires occurred then that caused the resin to melt and run down the trunk to form a ring at the base. The resin was dated by radiocarbon as 3880 ± 250 years. Whether the fire or fires concerned were started by Aborigines (whose implements were found there) or by natural causes, could not be determined.

When the Green Gully human remains were being excavated South of Keilor, one sample of charcoal was taken from above the bones and one from below. It was believed that in this way a space of time within which the burial occurred would be defined, but the dates were the same (8155 ± 130 years B.P.). The reason for this was that a large tree stump was burnt in place, and the fire followed down a major root. In such burning, the centre of a root is usually completely burnt, but charcoal forms where the root is in contact with the earth. Thus, if charcoal from the outer part of the root is preserved in two places, the two samples will give practically the same date. That the wood was burnt in place was shown by the burnt earth, and by the vertical grain of the wood recognizable in the charcoal (Casey and Darragh 1970).

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The Origin of Generic Names of the Victorian Flora

Part 2—Latin, Greek and Miscellaneous

by JAMES A. BAINES

Introductory Remarks.

As in Part 1, a prefixed asterisk indicates that the genus is an introduction, and its absence implies that at least one species is native to Victoria. In all cases the spelling is that currently accepted by professional taxonomists, in accordance with the international code of botanical nomenclature, even though some names have a hybrid appearance: for example, *Exocarpos*, the generic name for Cherry Ballart, should be *Exocarpus* in Latin and *Exokarpus* in Greek. The name as spelt in the original description, unless involving obvious error, is paramount. The names listed are as given in *A Handbook to Plants in Victoria*, 2 volumes, by J. H. Willis, and *The Distribution of Victorian Plants*, by D. M. Churchill and A. de Corona, and reference has been made to a number of books that will be named in the bibliography at the end of Part 2. Particularly useful have been *A Source-book of Biological Names and Terms*, by Edmund C. Jaeger, *Botanical Latin*, by William T. Stearn, *Plant Names Simplified*, by A. T. Johnson and H. A. Smith, *Glossary of the British Flora*, by H. Gilbert-Carter, *Flora of South Australia*, by J. M. Black, and *A Gardener's Dictionary of Plant Names*, by William T. Stearn and A. W. Smith. The most useful book for specific epithets (trivial names) is *A Popular Dictionary of Botanical Names and Terms*, by G. F. Zimmer. The index to Ewart's *Flora of Victoria* gives etymologies of generic names, but many are omitted, for no apparent reason except perhaps those of space.

Abrotanella Like *Artemisia abrotanum* (Southernwood), from Gk name abrotonum (abrotos = immortal); our *A. nivigena* (Snow-wort) = born in snow.

Abutilon Arabic abutilun, one of the names of the mulberry, which has leaves resembling those of malvaceous plants like *Abutilon* (Lantern-flowers).

Acacia Gk akakia, the Egyptian Thorn (*A. arabica*), from akē or akis, a point or thorn; akazo, to sharpen. Named by Miller in 1754 (after Tournefort).

***Achyranthes** Gk achyron, chaff or husks; anthes, flower. *A. repens* (Khaki Weed) is now *Alternanthera pungens*.

Acaena Gk akaina, thorn, alluding to the prickles on the fruit, as in our Bidgee-widgee and Sheep's Bur.

***Acanthus** Gk akanthos, a prickle, as in *A. spinosus*; our introduced species, *A. mollis*, is the classical acanthus of Greek architecture.

Acianthus Gk akis, a point; anthos, flower.

***Acer** Classical Latin name (as used by Ovid) of the maple tree, possibly from acer, sharp, the wood having been used for writing tablets. Introduced *A. pseudo-platanus* (Sycamore Maple) seeds prolifically and spreads easily.

Aciphylla Gk akē, a point; phyllon leaf. The name is more appropriate to New Zealand's species (Fierce and Horrid Spaniards!) than to Australia's.

Acmena Lat. *Acmena*, one of the names of the goddess Venus, perhaps derived from Gk *akmenos*, full-grown, in full vigour.

(Willis retains the generic name *Eugenia* for the Lilly-pilly.)

Acronychia Gk *akros*, terminal; *onux*, a claw. The points of the petals are curved and look like claws. This genus of our Yellow-wood was named by the Forsters, German botanists, father and son, with Cook on his second voyage.

Acroptilon Gk *akros*, at the top; *pilon*, wing. (Hj. Eichler places *Centaurea repens* (Creeping Knapweed) in this genus.)

Acrotriche Gk *akron*, summit or extremity; *thrix*, *trikhos*, hair; alluding to the tuft of hairs at the top of the corolla-lobes.

Actinobole Gk *aktinos*, ray; *bolē*, a throw, a dart. (Flannel Cudweed.)

Actinotus. Lat. form of Gk word meaning furnished with rays (see above).

Adenanthos Gk *aden*, gland; *anthos*, flower; alluding to the glands at the base of the ovary.

Adiantum Gk *adiantos*, unwetted, used by Greek authors for a plant with unwettable leaves, perhaps *A. capillus-veneris*, the fronds of which, if plunged into water, remain dry. Linnaeus adopted the name in its Latin form.

***Agave** Gk *agauos*, admirable, in allusion to the beautiful flowers.

Agropogon Gk *agros*, field; *pogon*, beard.

Agropyron Gk *agros*, field; *pyros*, wheat.

Agrostis Gk *agrostis*, a kind of grass (from *agros*, field).

***Ailanthus** A Latinization by Desfontaines of *ai lanit*, the Moluccan name for the Tree-of-Heaven (cf. Malay *kayu langit* = sky tree; *kayu*, wood or tree; *langit*, sky or heavens). *Ailantus* became *Ailanthus* on analogy with the common Latin *-anthus*, flower.

***Aira** From the classical Gk name for another (darnel) plant (cf. Gk *aira*, hammer, from *airo*, to destroy). (Hair-grass.)

Ajuga Probably from Gk *a-*, no; *zugon*, yoke (in its Latin form *jugum*), in reference to the calyx lobes being equal, not bilabiate; but Gilbert-Carter states that *Ajuga* was a name used by Scribonius Largus, physician, as a synonym of *abiga*, a plant, according to Pliny, producing abortion (Lat. *abigo*, procure abortion). (Austral Bugle.)

***Alchemilla** Arabic *alkemelyeh*, name of a plant probably used in alchemy (Arabic *alkimia*). The Arabic definite article *al-* was dropped, so alchemy became chemistry. (Lady's Mantle.)

Alectryon Gk *alektryon*, a cock or rooster (from *a-* no; *lektron*, bed, that is, unwedded, a reference to barnyard morals!). (Lat. *lectus*, Fr. *lit* and Eng. *litter* come from the same root.) (Smooth Rambutan.)

***Alhagi** Mauretanian *al-hag*, Moorish name for the Camel Thorn (*A. camelorum*), a noxious weed in our irrigation settlements.

Alisma Gk *halisma*, salt-loving, the classical name for Water Plantain.

***Allium** Lat. *allium*, garlic. (The Lat. name for onion was *caepa*, which is reflected in the botanical name, *A. cepa*.)

To be continued.

Notes on the Short-necked Tortoises *Emydura australis* (Gray) and *Elseya dentata* (Gray) in the Victoria River system, Northern Territory

by

A. J. COVENTRY* and C. TANNER†

In 1841 Gray described a tortoise, which although suspected of having been collected in north-western Australia, had no locality data. For many years this species was little known, and it is only recently that additional knowledge of it has been obtained. This species differs from any other described Australian species in the heavy symphysis of the mandibles, and the corresponding development of the alveolar surfaces of the maxillaries. He called this tortoise *Hydraspis australis*. Boulenger (1889) placed this species in the genus *Emydura*, where it has since remained. In 1842 Gray described *Hydraspis victoriae*, based on shells from the Victoria River, but in 1855 synonymized this

taxon with *Chelymys macquaria* (sic.). In 1872, he re-erected the name as *C. victoriae*, and while recognizing *C. krefftii* Gray, included specimens of this species with *C. victoriae*. Boulenger (1889) placed *H. victoriae* Gray with *Emydura macquarrii* (sic.), a move which other workers (e.g. Wermuth and Mertens, 1961) followed. Goode (1967) finally placed it with *E. australis*, where it at present remains.

In 1863 Gray described a second species from the Victoria River, which he called *Chelymys dentata*. In 1867 he erected a new genus *Elseya* with *dentata* as the type species. This

* National Museum of Victoria.

† Cooktown, Queensland.

Plate 1.

A small water-hole on Timber Creek, the preferred habitat of *Emydura australis*.



species differed from all other Australian species by the presence of a median alveolar ridge, and also from *E. australis* by the narrow symphysis of the mandibles.

As little has been published on either of these two species, we thought it appropriate to record some of the variations and habitat preferences observed during several weeks' field work on the Victoria River in September 1963 and August 1964.

Two methods were used to obtain tortoises. The first was drum nets made from collapsible steel rods and wire frames bolted together, with fishing net of 3 cm mesh drawn over the frame. Fish and beef proved equally successful as bait. The second method was gill nets in which free swimming tortoises became entangled. Drum nets proved to be much more productive, and had the advantage over gill nets of being always re-usable. Both types of net had to be checked at least twice daily to prevent captured tortoises being drowned.

Collecting was mainly from four waterholes (1 and 2) Timber Creek, a tributary of the Victoria River, (3) Jasper Creek, another tributary and (4) Tortoise Reach on the Victoria River proper. The two on Timber Creek were (a) Immediately behind the Timber Creek general store, approximately 1 km upstream from its junction with the Victoria River, and (b) A further 8 km or so upstream. The Jasper Creek hole was the southernmost one in Jasper Gorge, which is situated some kilometres north of the Victoria River Downs homestead. Tortoise Reach is upstream from Timber Creek, and quite close to Coolibah Homestead.

Not until a series of some fifty specimens had been collected was it evident that only two species (*Emydura australis* and *Elseya dentata*) were represented. The major differ-

ence in the shields of these two species is the nuchal, which is present in *australis* and absent in *dentata*. The shell of *australis* is very similar to that of *E. macquarii* of south-eastern Australia. There is a greater external difference between animals of varying sizes, belonging to the same species, than between those of similar proportions yet differing species. The greatest variations between the two species are most evident in juveniles and very old specimens.

The juvenile *dentata* are much more dentate on the posterior marginal shields than are the young of *australis*. When attaining a shell size approximately equal to that of a fully-grown *australis*, *dentata* is much flatter in appearance, and has a much smaller head. At this stage of growth, *dentata* has only reached about two-thirds of its maximum size. As maximum size is reached, the carapace becomes much more ovate, humped, and extremely dark. The plastron, uniformly pale in young specimens, becomes piebald and finally almost entirely blackish, except for a small central area. This darkening of the plastron was not observed in *australis*. At all stages of its development, until near maximum size, *dentata* has a fairly uniformly coloured head, which in older specimens becomes mottled. On the other hand, *australis* has the two head stripes typical of some of the other *Emydura* species, differing only in juvenile *australis*. These stripes are a bright salmon red, which gradually fades until in old specimens it is only pale pinkish.

Although both of these species inhabit the same river system, it became evident during collecting that *australis* showed a marked preference for smaller waterholes than those preferred by *dentata*. Thus, at Timber Creek, the smaller (both in width and depth) holes had a marked predomi-

nance of *australis*, the larger deeper hole at Jasper Creek a predominance of *dentata*, while the extremely large waterhole in the main stream at Tortoise Reach yielded only *E. dentata*. Whether further collecting will confirm these findings awaits to be seen.

Perhaps it is interesting to note that the waterhole in Jasper Creek had a large population of Freshwater Crocodiles, *Crocodylus johnsoni*, a species which was apparently absent in Timber Creek. Whether or not this reptile preys on the tortoises, or influences the preferences of waterholes, poses an interesting problem.

The only other tortoises collected were one *Chelodina* sp. taken in a drum net from the hole behind the Timber Creek store, and several specimens of *C. ? rugosa* dug up by Aborigines from an aestivating site at King Billabong on the Victoria River several miles downstream from its junction with Timber Creek.

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Report on First Natural Conservation Study Conference

Through the generosity of the A.C.F., who paid air fares for delegates from some 80 bodies, I was able to represent the Club at the First National Conservation Study Conference, held in Canberra on November 16-18.

Proceedings opened with a key-note address by Dr. M. H. Cass, who pointed out that the aspect of the environment with which we are all immediately concerned, and which is suffering the most rapid deterioration, is the cities, but that the Conservation movement tended to be supported mainly by the middle-class and had been concerned mainly with rural areas. He suggested that the movement could not really succeed unless it won the support of the workers, and that to do this it must become concerned with the urban environment. Although strenuously opposed by some delegates, this concept seemed to be supported by most of those present.

A series of papers summarizing the position in the various States was then given, and after discussion of these the Chairman, Mr. Serventy, attempted to define Conservation and enumerate its aims.

The delegates then divided into a number of syndicates to consider different aspects of Conservation, including environmental law and administration, organization and finance, communications, development of leaders, relations with officialdom, education, planning proper land use and rationalizing the classification of reserves, etc.

Papers were also given on the aims and role of the A.C.F., guidelines for co-ordinating the activities of the various bodies, Australian environmental law, and Judith Wright read a paper prepared by Mr. Justice Hope,

Chairman of the National Estate Committee of Enquiry on "How Conservationists can Preserve and Enhance the National Estate". Finally, the syndicate leaders reported their conclusions and Professor Turner summed up his impressions of the Conference.

I feel that the Conference was extremely valuable, both as an opportunity for meeting conservationists from other States, hearing about their problems and learning from their experience, and in enabling the Conservation movement to begin to work together towards a common goal.

A number of problems emerged, particularly concerning the role of the A.C.F. and its relations with the State Conservation Councils. It seemed to be the feeling of the meeting that there should be a central body to co-ordinate the activities of the State bodies, and to represent them in negotiations with the Federal Government. Both the Federal Government, by allocating the A.C.F. \$50,000 for distribution among the various local bodies, and the Conservation Movement, by its rejection of the former A.C.F. Executive, seem to have indicated that they feel that the A.C.F. should fulfil this role. However, it was forcibly pointed out that the State Conservation Councils would be very reluctant to grant the A.C.F. any special status as a central co-ordinating body while it retains its present structure and membership.

In conclusion, I personally found the weekend very stimulating, having become somewhat depressed by the general apathy of F.N.C.V. members and by overwork, in and out of the Club, and I hope that the Conference may provide a stimulus to the Club so that it can resume its former leading role in the Conservation movement.

Field Naturalists Club of Victoria

General Meeting

12 November

The main business of the meeting was the presentation of the Natural History Medallion for 1973 to Mr. Edmund Gill. Guests at the meeting included Sir Robert Blackwood, Chairman of the Medallion Committee, Dr. McNally of the National Museum, Professor and Mrs. Sherbon Hills and Mr. and Mrs. Gill.

In making the presentation Professor Hills said that he felt that Mr. Gill had been honoured by the club not so much for his services in the course of his professional duties, but for what he has done that is personally interesting to him, which was chiefly the study of the geology of the Quaternary Period. He recalled that in order to pursue this interest Mr. Gill had need to study zoology as well as geology, as the interpretation of fossil findings had been an important part of his work.

Following the presentation Mr. Gill gave an illustrated address on "Changes in the Natural History of Victoria as revealed by Radio Carbon Dating". Mr. Gill gave many examples of the way these various dating techniques had widened knowledge of the time scale of natural events, such as the history of coastal changes, the sequence of volcanic activity and the period of aboriginal occupation.

Mr. Kelly moved a vote of thanks to Mr. Gill for his address and to Prof. Hills for presenting the Medallion; he also expressed the Club's thanks to the Medallion Committee for the work they had put in to deciding the winner. Mr. Riordan announced that Mr. Jim Baines would retire as Secretary of the Committee at the end of the year and thanked him for the efficient way in which he had carried out his duties. Incoming Secretary of the Committee is Mrs. Margaret Corrick.

Among the exhibits on display was a spider and its egg sac, some insect larvae for identification and oolites from Central Australia under one of the microscopes.

Miss Young announced that club member Mr. Vic. Miller had recently celebrated his 99th birthday and also that she had available a number of copies of a song "Anthem for Youth", the words and music of which had been written by the late Tarlton Rayment.

The book stall was in operation as usual and orders are being taken for the second edition of "Flowers and Plants of Victoria" by Cochran, Fuhrer, Rotherham and Willis, and for a new book in similar form "Flowers and Plants of Western Australia" by Erickson, George, Marchant and Morcombe. Both these books will be available to club members at a special price.

Full lists of correspondence were displayed and the Secretary announced that he had been pleased to hear from the New South Wales Government that the proposed road through the Burendong Arboretum in Canberra, about which the Club had protested, would not now be built. Acknowledgment had also been received from the Port Phillip Authority of the Club's submission concerning management of certain areas of shoreline. Miss Madge Lester agreed to attend discussions with the Authority as the Club's delegate.

Mr. Kelly said that Council regretted that the November edition of the 'Naturalist' had not gone out on time but power restrictions due to the strike by S.E.C. workers had caused delays in printing.

Botany Group Meeting

8 November

There was a good attendance at the November group meeting to hear Miss Madge Lester who spoke on "The Alternation of Generations in Green Land Plants". Miss Lester explained that when there is such an alternation the generations do not follow each other AAA, but go ABAB. As well as being different in appearance from the parent, the offspring has a different quantity of hereditary material — either half or double the chromosome number of the parent.

With diagrams, Miss Lester showed the result of cell division in growth, and then the reduction division that produces haploid cells. In animals these haploid cells are the sex cells; in plants they are spores — and such a spore grows into an organism where all the cells are haploid.

The life cycle of a fern was shown as the easiest example. The familiar sporophyte fern is diploid and produces haploid spores; a spore grows into a haploid gametophyte that looks like a fragile quarter-inch liverwort; the gametophyte produces the gametes or sex cells; union

of a male and female cell is the beginning of a new sporophyte fern. At first the young sporophyte takes all its nourishment from the parent gametophyte, but it soon becomes independent. Miss Lester then dealt with mosses, where the gametophyte is the dominant generation, and the sporophyte fruiting body is attached to, and largely dependent on the parent gametophyte for its entire lifetime.

The talk proceeded with one of the club mosses, which Miss Lester prefers to call club ferns, because the sporophyte is the dominant generation. The genus *Selaginella* has two kinds of spores which develop into two kinds of gametophytes, and the gametophytes begin to grow when still inside the spore, while receiving nourishment from the parent sporophyte.

The two kinds of spores demonstrated by *Selaginella*, and the small size and dependence of the gametophyte culminate in the seed plants—conifers and flowering plants. In seed plants the microspores are called pollen grains, while the sporangium that produces the megaspores has an extra covering and the whole is called an ovule. The megaspore (i.e. nucellus), the female gametophyte (i.e. embryo sac), and the fertilised cell are retained in the ovule. The fertilised cell develops into an embryo sporophyte inside the gametophyte tissue, both being nourished from the parent sporophyte. Finally the embryo stops growing and the outside of the ovule forms a firm coat. The whole is a seed ready to be shed.

Miss Lester illustrated her talk with a series of very clearly drawn diagrams which she had prepared herself.

An unexpected addition to the meeting programme was the showing by Mr. Peter Kelly of some slides of Western Australian wildflowers, taken by Mr. Alwyn Pepper, who specialises in nature photography. Mr. Harry Bishop also showed some slides of orchids which he had taken on a recent trip to Western Australia.

Miss White exhibited a species of *Nitella*, collected in Werribee Gorge, bearing mature antheridia and gave a brief explanation of the reproductive structure of this alga. She also showed some pressed plants collected on the Club's spring trip to the Warrumbungle Range.

Mrs. Corrick showed and spoke about two members of the Compositae family,

Cassinia aculeata and *Helichrysum dendroideum*.

A report was given on the Group's plant survey trip to Riddells Creek area, and a list of about 190 species found in the two localities visited was tabled.

At the December meeting there will be an election of office-bearers for the Group in 1974; and the meeting will be followed by the usual Christmas supper.

Day Group

Latrobe University — 18th October, 1973

Despite early rain, thirty-one members attended, and the day became fine and sunny later. The meeting was held in the Glen College Conference Room.

Mr. Fairhall chaired the meeting and welcomed members and friends.

Apologies: Mr. and Mrs. Dodds, Miss Herhstreit, Mrs. Pearce and Miss Baalam.

Minutes of the previous meeting were read, moved Miss Bell, seconded Miss Owen. The next and last meeting for the year in November will be held at the Natural Resources League at Springvale. No meetings will be held in December or January. During the week a committee meeting was held at which tentative arrangements for outings during 1974 were made.

At the conclusion of the meeting lunch was taken and tea, coffee, milk and sugar were kindly provided for members. After lunch Mr. Butcher, of the Gardens Department, joined us, as did Mr. Saul later, and explained that prior to 1966 the area was a huge cow paddock, boggy and covered with reeds and rushes. Approximately 25,000 plants and 8,000 trees have been planted. Noted were the lovely red-gums which are native to the area. The following were mostly in flower and a lovely sight—*Grevillea bitternata*, *G. poorindaqueen* Clearview David (Hybrid) *Diosmafolia*, *Melaleuca* sp. and *Kennedya rubicunda* to name just a few.

Mr. Butcher and Mr. Saul were thanked for making a most interesting and pleasant day for the members, who made their way home at about 3.30 p.m. after a very happy day.

Mammal Survey Group

The Mammal Survey Group's October camp was held on the 20 and 21 October in the Otway Ranges, approximately 11 km S.E. of Forrest. The 12 members and nine visitors who attended the camp persevered in wet and windy weather to record five native and one introduced species of mammal for the

area. Trapping yielded two species — Bush-rat (*Rattus fuscipes*), and Swamp-rat (*Rattus lutreolus*). The animals were sexed in camp before being released at the place of capture. It was surprising not to trap any Brown Antechinus (*Antechinus stuartii*), which have been previously trapped by the group in similar habitat in the Otways. Spot-lighting was spoiled by the weather, only Ringtail Possum (*Pseudocheirus peregrinus*), and Black Wallaby (*Wallabia bicolor*), being seen. Other species recorded by daylight sightings were Platypus (*Ornithorhynchus anatinus*), at Slide Lake, and Feral Cat (*Felis catus*). Outside the survey area, on the road near Forrest, a dead Echidna (*Tachyglossus aculeatus*), was seen.

The guest speaker at the October meeting was Dr. John Nelson on the subject of animal behaviour. The talk was illustrated with films of flying fox colonies (*Pteropus* sp.) and captive

specimens of *Dasyuroides byrnei*, with slides of other examples, mainly laboratory animals. It was impressed upon members of the difficulty in obtaining information on the behaviour of many species under natural conditions.

At the November meeting Jack Hyett gave the group an interesting talk on a study he and students have made on a population of *Rattus rattus* at Skenes Creek. Mr. Hyett also spoke on some of his recent observations of New Holland Mouse (*Pseudomys novae-hollandiae*). Members then gave reports of recent sightings of native mammals, and discussed future camps.

The November camp will be on the 17 and 18 November, near Heathcote, and the December camp will be held on the 8 and 9 December on the Mornington Peninsula. The Christmas camp will be at Wingan Inlet, and more details of this camp can be obtained at the December meeting.

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Western Victorian F.N.C. Association

Report of Clubs' Activities for year 1972

ARARAT F.N.C.

President — Mr. Stan Kelly. *Secretary* — Miss Z. Banfield.
Membership 20.

Unfortunately, bone-seed has made its appearance in McDonald Park, and members have been active in pulling out plants. A successful Western Victorian conference was held in April. Delegates attended the Colac and Creswick meetings of the Association. Nineteen members went on a week-end tour of the Little Desert in September, and were fortunate to be shown by Keith Hateley, his favourite Mallee Fowl "Romeo" at his nest. The party enjoyed a 110 mile trip through the desert.

BENDIGO F.N.C.

President — Mr. Robin H. Moors. *Secretary* — Mr. Peter N. Ellis.
Membership 120.

The club was successful in Nov./Dec. in having 20,100 acres of State forest in the Whipstick declared a forest park. The Forestry Commission is employing a student from University (now a professional Forestry Officer) to complete a survey by March with regard to picnic and toilet facilities in the Whipstick. The park consists of a northern section of approx. 14 sq. miles and a southern section of approx. 19 sq. miles. We hope ultimately to have 11 sq. miles of crown land to join the areas together. Presently we are more concerned about the risk of the private land being cleared and fragmenting the ecological unit; attempts are being pursued, through the shires and local Members of Parliament to have this land protected.

COLAC F.N.C.

President — Mr. R. Missen. *Secretary* — Mr. P. Dorman.
Membership 54, 3 Juniors.

The Club meets second Friday each month at 8 p.m. in St. John's Hall, Pollack St., Colac. Programmes for the year have been varied and informative, with subjects to cover as many interests as possible. We have had seven visiting speakers, three members nights and an evening of films from the State Film Centre. Subjects have included Kruger National Park, Otway fauna and flora, Fossils, Work of field survey group of F.N.C.V., and birds of the East coast. Excursions included Mt. Sabine, Stony Rises, Barongarook and Yaughner Reserves, Tower Hill, Lake Purrrumbete, Chapple Vale, Yeo, Grey River and Horden Vale. In August we were host club to the W.V.F.N.C.A. when the Saturday's Programme included excursions to Lardiners' Track and Red Rock, followed by an address in the evening by Mr. Brian Timms of the Zoology Dept. of Monash University, on the Ecology of the Lakes of Western Victoria. An excursion to Arkin's Creek on the Sunday concluded a very successful week-end. A number of members participated at the meetings of W.V.F.N.C.A. at Ararat in April and Creswick.

CRESWICK F.N.C.

President — Mr. H. L. Barclay. *Secretary* — Miss Jean Wilson.
Membership 35.

The Club enjoyed a very successful year, with well attended monthly meetings held in St. John's Hall, Creswick, on the 3rd Thursday of the month. Field Excursions to Point Lonsdale, Clunes Swamp, Ararat, Colac, Creswick School of Forestry, Slaty Creek and Mt. Beckworth, and meetings of the W.V.F.N.C.A. were all strongly supported. We enjoyed our turn as Host Club for the Association Camp Out and Annual Meeting in October, with gold seeking in Slaty Creek and an excursion to Mt. Beckworth. The Guest Speaker on the Saturday evening was Mr. Alan Sonsee, who spoke with authority on the local district flora. A Club badge, featuring the local Wiry Bossiaea, was produced. One of our members built a substantial cupboard for the repository of Club property. Members were successful in ridding Calambeen Park, Creswick, of bone-seed which had threatened to take over; we didn't keep an exact tally, but something between three and four thousand plants were accounted for.

continued January issue



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FORESTS COMMISSION, VICTORIA



Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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Ordinary Members	\$7.00
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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 14 January — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Members' Night.

New Members—

Ordinary:

Mr. G. M. Balding, 19 Frogmore Crescent, Park Orchards, 3114.

Mr. A. G. Davey, 10/432 Cardigan Street, Carlton, 3053.

Mr. Noel D. Purdue, Flat 4, 372 Toorak Road, South Yarra, 3141 (*Mammals*.)

Country:

Miss Jenny Barber, "Yarra Doon", Launching Place, 3139. (*Fauna and Flora*.)

Laura D. Moncur, "Minnehaha", Thorpdale, 3835.

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Wednesday, 16 January — Microscopical Group.

Monday, 4 February — Marine Biology and Entomology Group: 8 p.m. at National Museum, Library Conference Room.

Wednesday, 6 February — Geology Group.

Thursday, 8 February — Botany Group.

JUNIOR F.N.C. MEETINGS

Friday, 1 February — Preston meeting at 281 High St., Preston (Rechabite Hall) at 8.00 p.m.

Friday, 8 February — Montmorency and District in Scout Hall, Petrie Park, at 8 p.m.

Friday, 8 February — Black Rock meeting at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Cres. and Bent Parade.

Friday, 22 February — Hawthorn meeting in Town Hall at 8 p.m.

F.N.C.V. EXCURSIONS

Sunday, 20 January.—Beach excursion. The bus will leave Batman Avenue at 9.30 a.m. Bring two meals. Fare \$2.40.

Sunday, 1 September, to Sunday, 8 September.—Kangaroo Island. This excursion will start from Adelaide and includes Motel accommodation on the Island, air travel between Adelaide and Kangaroo Island, and day excursions at the cost of approximately \$135. Starting from Adelaide will enable members to spend extra time in S.A. if desired but a group booking can be arranged on the train if members wish to travel on the same day. Bookings for this excursion were already made when we discovered the National Parks Association considering a trip to Kangaroo Island also, but we felt both excursions could be successful as the dates differ and the size of the N.P.A. party is strictly limited.

Editor:

G. M. Ward

Assistant Editor:

G. Douglas

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Front Cover:

The attractive male of the Mountain Duck
(*Tadorna tadornoides*).

photo: John Wallis.

Following comments from some readers about the format of the contents page, a new layout has been adopted.

The right hand column in future will be devoted to the writing of some topical comment on an aspect connected with Natural History, Ecology, or Conservation.

It is hoped that the new form will please those readers who have been kind enough to indicate their opinions, and to those who have thought about the need for a change.

Editor

Early Naturalists' Writings – 5

From Dudley Le Souëf's book *Wild Life in Australia*, written in the early part of this century, we take the fifth writing of this series — a chapter entitled "Gembrook".

For many years I used to visit this beautiful district very frequently, and always found something of interest in its deep shaded gullies or densely timbered ranges. The Eucalyptus trees were very tall, especially in the gullies, where they reared their lofty heads to obtain sun and light, and the undergrowth was often very dense, consisting principally of hazel wire-grass, sword-grass, and similar vegetation.

In the early days, before the country was as well cleared as it now is, the native animals were far more abundant. On one occasion, when camping in a small bark hut, I was asked by my companion if I thought there were any snakes about, as during the night, something had passed over his legs. I scouted the idea: but after he had gone out for the day, I searched under the floor and found the culprit in the shape of a Tiger Snake, which I quickly despatched. In the stable near the house mice were plentiful, and Tiger Snakes used often to live under the floor in luxury. On one occasion we killed one of these snakes and, as it was in prime condition, determined to try what it was like cooked; but the cook would not touch it, so I had to prepare and do it myself. I put various ingredients in to make it appetising, but for all that found it rather dry and bony, though the flesh was white. In Northern Australia, however, the Carpet Snake is an esteemed article of food among the Aborigines.

We once made a Tiger Snake bite a mouse, which was dead in twenty-one seconds, and on several other occasions when we did the same thing,

found the time vary from twenty to forty seconds. On one occasion a young man thought he had discovered an antidote, so he brought me a kitten, which had had the hair shaved off the part he wished the snake to bite.

Well, I caught a Tiger Snake, and holding it by the neck, made it bite the required spot, but while the owner was looking for the punctures to rub in his so-called antidote, the poor kitten died. He thought then that his antidote would hardly be strong enough to check such a rapid poison.

Many native birds, especially those nesting on or close to the ground, naturally hold the snake in wholesome dread, and try to drive it away from their neighbourhood. The whereabouts of one of these reptiles is often known by the commotion among the birds.

The snake on being so attacked, appears to be frightened, and often withdraws a short distance, and when safely ensconced in a convenient spot, coils itself up, and, as the birds dart at it, keeps withdrawing its head. The birds become emboldened and careless, and probably one sooner or later comes within reach, when, quick as thought, the snake darts at and catches its unwary victim. I have never seen anything approaching fascination, nor do I think it exists, except in story books.

On another occasion I had been out of the State for some months, and on my return went up to Gembrook for a few days. In the evening I heard some curious sounds proceeding from the direction of the bark kitchen, about twenty yards from the house. It was a bright moonlight

night, and I was sure the noise proceeded from domestic cats; and as pheasants were being reared at the place, wandering cats found were promptly shot. So I carefully loaded my gun, stole quietly out and proceeded cautiously in the direction of the kitchen, with the gun cocked ready for the supposed puss; but as I got closer to the kitchen, the sounds seemed to alter and come from inside the building.

I was very puzzled, and could not make out what animal could be producing the curious sound, but, going up to the building and peeping in, I saw Gee Sue, the Chinese cook, playing his fiddle, and he and a friend who had dropped in to see him, singing a duet. I do not know if any of my friends have ever heard two Chinamen singing a duet, but if they have, they probably will not be surprised at my mistake.

I said nothing but went back to the house and put my gun away without attracting attention. I have heard the squeaking fiddles many times since, both in China and elsewhere, but whenever I hear them, always think of my first introduction to them with the duet.

Flying Phalangiers, or as they are locally called, Flying Squirrels, were plentiful, and their loud running shrill note often heard. It was interesting to see how quickly they scramble up a tall Eucalyptus tree, and when a distance from the ground, suddenly launch themselves into space and glide rapidly with feet outstretched and head up to the foot of some neighbouring tree, their long bushy tail making a capital rudder.

When climbing, they go like an opossum, that is, with jerks, moving all their feet at the same time. Their fur is beautifully soft and long, but their skin thin. They come out of the

hollows in which they sleep during the day, about dusk.

An interesting nesting site of one of these animals was recently noted by a correspondent of the Melbourne "Argus" who stated as follows:—"We were all out one day after a bee tree. The first thing we saw when the tree fell was a Squirrel, which came out of the tree about 15 ft. above the bees' nest. We all ran to catch it, but it got up a wild cherry tree. Further efforts to capture it were frustrated by the bees. My hair was soon singing with them and by the time I had got rid of them the Squirrel was gone. When the tree was opened and my husband was taking out the honey, in the midst of the comb he found the squirrel's nest, made of leaves and lined with grass."

The Short-eared Opossum was often heard at night and many were caught by fixing a running wire noose on a sapling that was placed in a leaning position against a tree in which the animal lived, as it would always prefer going down the leaning stick to the straight trunk.

It is easy to tell whether an Opossum lives in a certain tree or not, for if it does, a well-worn track on the upperside of the trunk will be noticed leading to its retreat. Of course individual claw marks will always show whether these animals are plentiful or not.

They ascend the tree in a succession of jerks or short jumps, stretching out their feet and claws as far as possible on each side and rarely losing their hold. Their natural food is Eucalyptus leaves, but if these are unobtainable on account of the destruction of the timber, they then subsist on grass, weeds, etc.

On the islands of Kent Group in Bass Strait these animals are still found, but as there are no trees with hollows large enough for them to enter, they camp during the day under

the tussocks of grass. They also do the same thing at Kangaroo Island, where they have no natural enemies. On one moonlight night I went out to shoot these creatures and after a time I saw what appeared to be a large Opossum in a tree, and, carefully getting it between the moon and myself, fired. It did not fall, so I fired again, but still no move, but as I was sure that it had been hit, I left it, presuming I would find it dead under the tree in the morning; but on going there again in daylight I saw what I had taken to be an Opossum was only an excrescence on the branch covered with moss, which looked like fur.

They are very partial to the white pith of the Tree fern and also have a weakness for fruit.

Native Bears were also plentiful, resting during the day in a fork of a tall Eucalyptus tree, and they were much more partial to the White gum trees than any other.

Their deep grunting call could be heard for a considerable distance, but mostly during the evening, except in dull weather. They are quiet, inoffen-

sive animals and easily tamed, but will not live in captivity for any length of time, even when fed on Eucalyptus leaves.

When their single little one is able to leave the pouch, it frequently gets on to its mother's back and holds on there while she is climbing about the branches, and the young one has a curious cry, almost exactly like a small child. On windy nights especially the shrill cry of the young one can often be heard, answered by the deep bass voice of the mother.

Their fur is very dense and their skin thick, and consequently they are difficult to shoot with ordinary shot, especially as they generally rest on the higher branches of the tall trees.

I well remember a worthy doctor, who thought he could shoot, going out one day to get a bear he had heard calling out the previous night. After a time he located it a good distance from the ground and carefully fired at it asleep in a fork of the tree. The only effect of the shot was to wake the bear up and make him look down to see where the noise came



Plate 1

The Common Opossum was often heard at night

from; a second shot was fired, and the bear thought it was time to shift his quarters and get higher up, and as he was ascending slowly hand over hand, was fired at again, but the only effect was to hurry him up a little. Well, to make a long story short, my friend kept firing away at the bear and the bear eventually got as high as the branches would hold his weight and there remained. At last the Doctor found that he had no more cartridges left, and counting the empty cases found he had used nineteen, and the bear still apparently smiling at him from the top of the tree! He gave up shooting for that day and never got the bear, but it was only by accident that we found out he had used nineteen cartridges. He forgot to tell us!

Native Bears are also very tenacious of life, even more so than the proverbial cat. I remember one that had been brought to the ground after being fired at twice and it fell a distance of about one hundred feet, landing with a heavy thud on its back. It was then knocked on the head, in case any life remained in it, and to keep its body out of the way of prowling dogs, was hung up to a branch by the hind legs and left. This was about ten o'clock in the morning, and when, late in the afternoon, the sportsman called for the animal, to his great surprise he found it still alive.

I saw on one occasion a large forest tree over two hundred feet high cut down. It fell a thundering crash, making the ground tremble, and when looking at the wreck, I noticed a Bear lying on the ground that had come down with the tree. We all looked at the animal, thinking of course that it was dead, but when the men had gone on with their chopping, I saw it slowly open its eyes and look round, and seeing no one moving near it, it commenced slowly crawling

to the nearest tree; but one of the men caught sight of it, and before he could be stopped, had knocked it on the head with the back of an axe and apparently finished it. Shortly afterwards, however, I again saw it open its eyes and quietly look round; and seeing the coast clear, it again made for a neighbouring tree and this time was successful, as it surely deserved to be.

There is a strong ridge of bone running down the centre of the forehead, and therefore, knocking it on the head seldom kills it.

Mr. George White informed me that on one occasion he saw a pair of Native Bears together on a White gum tree on the banks of the Goulburn River. Another essayed to join them, but was repelled and backed away along a branch overhanging the river; when near the end, and unable to proceed further, the attacking bear closed with him and they fought savagely; but the branch being so thin, one lost his balance and carried the other with him. They both fell into the river below, which cooled their ardour, as on swimming to the bank they both went different ways.

In the thickly-timbered gullies we often used to catch the Brush-tailed Wallaby by setting snares in their runs. On one occasion, I set a dog gin-trap, but a wallaby got into it and hopped off with it, and that was the last I saw of the trap.

They remain in the scrub during the day, coming out to feed in the evening and at night. We used occasionally to stalk them, but could only be successful in wet weather, when the dead leaves and twigs on the ground were damp and so did not crackle; but even then extreme caution had to be used. They generally crossed the creeks on old logs that had fallen across.

The bulky nests of the Ring-tailed Opossum were very common, and the parents with their two or three young ones were occasionally captured. They make interesting pets and can hang by their tail, which is prehensile and has the skin on the lower part of the end bare and rough to prevent slipping.

Native Rats and Mice were sometimes caught in traps, including the Thick-tailed *Dromicia*. This little animal, in common with many other small forms, gets very fat in autumn and lies dormant in some small hollow during the winter. When coiled up it looks like a furry ball and can be rolled about a table without making it uncoil, provided it is not warmed.

A few Wombats had their deep burrows in the ranges, and occasionally a venturesome terrier would go down one to bait the wombat, but he generally got the worst of it and had to retreat backwards, there not being room for him to turn round.

As before mentioned the Tiger Snake was found in this district, though not in great numbers. I remember on one occasion jumping off a large log in a fern gully and, when too late to check myself, saw a Tiger Snake coiled up on the ground below. Anyhow I landed plump on top of the snake, but not waiting to see how matters stood, I scrambled back on the log and when safely on my perch again looked for the Snake, who had also thought discretion the better part of valour. If the truth were known, I expect the Snake was just as scared as I was and probably got more damaged; but since that time I have had many encounters with these reptiles, as with others of their kind, and have captured them by putting my foot on them with just sufficient force to hold them and then working the foot up to the neck, so that they cannot turn round; they can then be

safely caught by the back of the neck and lifted up. But one has to be very quick, as a Snake does not as a rule waste time or lose his presence of mind as we are very apt to do.

These reptiles are very prolific, occasionally having as many as fifty-two young; but the numbers vary considerably, thirty being about the average. The little ones have plenty of enemies — Iguanas, Hawks, Laughing Jackasses, Butcher-birds, Crows, etc.

We are often told that they commit suicide by biting themselves when struck with a stick. They cannot poison themselves, but when hit and badly wounded sometimes strike at the seat of the pain as animals often do; they seem quite immune to their own poison. I have seen these snakes bite one another badly without any ill effects.

Then again one often hears about them swallowing their young. Well, I have often had them in captivity at the Zoo and young have been born on several occasions, but I could never make the mother swallow them; and again if her throat was a receptacle in time of danger, like the pouch of a marsupial, she could not possibly make room for say fifty, and it would be contrary to nature for a mother to have room for about a dozen and not the rest. When anyone sees a snake at close enough quarters to recognise the little ones, about six inches long, they are generally more or less anxious in case the snake may go for them, and all their time is taken up watching the big snake, without watching the little ones that are hardly visible. When any danger threatens them, the young at once make for any cover they can find, even trying to take refuge under their parent, as they would under a stick. It is astonishing what a little cover will hide them, and if they do accidentally get down their mother's throat, I should

think it was very doubtful if they ever came out.

On two or three occasions I have found what are called double snakes; that is, two of these reptiles get hold of the same prey, neither will let go, and eventually the larger one often gets the head of the smaller in his mouth and proceeds to swallow him, too, as well as the prey; and when the head of the smaller one is in the mouth of the other, it cannot open its mouth wide enough to withdraw its curved teeth from the prey, and so perforce of circumstances has to go down; but as the snakes are often nearly about the same size, it follows that perhaps only about three parts can be swallowed, and as the head gets digested, the tail part, which meantime is sticking out of the other snake's mouth, is gradually drawn in.

They can swallow prey of broader dimensions than themselves, as the bones of their jaws are held together by elastic tissue and can therefore expand considerably; for instance, a Copper-head snake five feet long can swallow a Sleeping lizard, and a Carpet Snake twelve feet in length, a Kangaroo Rat.

When a non-poisonous Snake catches its prey it puts two coils only round it, and so quickly that it is impossible to follow its actions; it then draws the coils tightly, breaking the back and half crushing its victim. When life is extinct, it works its coils from the head of its prey towards the tail, breaking down the joints and thereby making it easy to swallow. It then commences on the head, moving first one jaw forward a little and then the other, and gradually draws its food down. I need hardly say it does not lick its prey over first to lubricate it, as it were. That is only seen in old story books.

Constricting Snakes often get their ribs broken, but they easily mend

again, a small bony lump forming at the place.

Venomous Snakes occasionally have their fangs broken in catching their prey, but they are soon replaced, generally in about ten days.

The top of the fang of a venomous Snake is solid, and the opening just below; consequently when any one gets bitten by any Australian Snake through a woollen sock or similar material, there may possibly be the marks of the points of the two fangs on the skin, but the poison itself will probably be in the material, as the fangs are short.

When they strike a Mouse, they do not usually retain it, and it soon dies close at hand. The Snake after a short time, circles round, gradually increasing the distance from the starting point until he finds it; but if he strikes a Frog, which is cold blooded, he carefully retains his hold. If he did not it is not likely he would see the Frog again, as he has probably learned by experience.

On one occasion we took five young Quail out of a snake we had killed.

I was once bitten by one of these snakes which was about six months old, and the only effect was to give me a bad headache. I was carrying it in my pocket at the time, with my hand over it to prevent its escaping; and that reminds me that some years ago two venomous Water Snakes were sent to me from Queensland. They apparently died one cold night, so, putting them in my pocket I took them to town to preserve them in spirits, but when in a crowded omnibus I felt as I thought someone moving my pocket, so putting my hand in it, found my two snakes awake and squirming about, the heat having revived them; but I managed to keep them in until the city was reached, but I have often thought since what

the result would have been if one had got out.

They cannot travel fast on sand, as the loose material does not offer any resistance to the ribs or belly scales.

When at King Island with members of the Field Naturalists' Club of Victoria, I had collected one day about a dozen Copper-head Snakes, and had to transfer them from the collecting bag to a box, so emptied them all out on the sand, my friends looking on from a distance and offering me advice. I was then enabled to pick them up one by one, as they could not escape. But in the scrub it is another matter, and they can travel with considerable speed, proceeding with a waving motion and using the vegetation to help themselves along. A large Black Snake will go as fast as a man can run, in suitable country, although in such cases I never think a man runs his fastest, as he always has the thought uppermost in his mind, "supposing the snake was to stop suddenly and turn round, where would I be?" And I think the idea would affect his speed.

Carpet Snakes and Lizards in South Australia generally lay their eggs about March or April, as they are hatched more by a certain degree of moisture than heat, and if their surroundings get too dry they shrivel up and die; consequently the hot summer weather would not be favourable. The eggs are generally advanced in incubation before being laid.

The young of the Tiger Snake are generally born alive in April or May, and occasionally in the latter end of March. They then measure $7\frac{3}{4}$ inches in length and weigh 60 grains. Their mothers are then generally lying in a semi-dormant state in some hollow log or hole in the ground for the winter, and the young are consequently well able to take care of themselves when spring comes along. The young

of the Tiger, Black, and Copperhead Snakes are born alive but curiously enough, the Brown Snake, which is also venomous, lays eggs, from twenty to forty, generally in a burrow in the ground, from three to four feet long; they lay them in January or February.

Snakes cast their skins several times in the year, the skin of the eye coming off as well as the rest, generally complete. Therefore the snake, having no eyelids, cannot close its eyes and consequently cannot be caught asleep; but when disturbed it often remains perfectly still, apparently hoping to be unnoticed.

The colour of a snake often varies according to its surroundings. For instance, in the open dry country such as the Mallee, the darker bands are a yellowish green; then again, in the denser cover of Gippsland they are a dark olive green, and in the Islands of Bass Strait among the tussocky grass, a greyish green.

Lizards were of course plentiful, including one locally called a "Blood-Sucker", with a yellow mouth, which, when caught, generally shammed death. They are of a grey colour and most difficult to detect as long as they remain still. They can run very rapidly, either on the ground or up a tree.

The most troublesome insects were the Bulldog and Soldier Ants. They generally had their nests in rotten logs and were very vicious if disturbed. Their bite was painful and caused much swelling.

I have known of two drunken men who lay down by a nest of these ants and went to sleep. They were bitten on the neck and face, and the swelling made thereby caused their death; so we always kept an eye open for them when camped in the bush.

There were a few Mason Wasps. They made mud nests under logs in

which they placed the spiders as food for their respective young in larvae form.

On the black burnt timber we occasionally found both a dark coloured Spider and a small Moth of a similar colour, and when they remained still on the burnt wood, they were practically invisible. We used to try to make them settle on light-coloured wood but without success, as they would not stay there unless pinned. They evidently knew instinctively when they were protected by their surroundings.

In all the gullies of this district Lyre-birds were to be found, and it was a pleasure listening to their loud, clear note. We often found their nests, in varying situations, such as in a steep bank, on the top of a Tree fern, or in the fork of a tree at varying heights from the ground, up to about eighty feet.

Being weak flyers and almost entirely ground birds, they flew or jumped from branch to branch until they gradually worked their way up to the level of their nest. They also roosted at a considerable distance from the ground, working their way up in the same manner. They generally build their nests in June, laying early in August; the entrance as a rule faced down hill towards the creek, probably because there was a better outlook; and in sitting on their single egg their tail was kept over their back, the tip often showing at the opening of the nest just above the head of the bird. The hen usually sits, but on one occasion I disturbed a male bird from the nest.

When the young is disturbed in the nest, it utters a shrill cry of alarm, which quickly brings its mother to the scene. She is often very fearless at such times, but the male bird is more wary and carefully keeps out of sight, however much his offspring may call.

They are difficult to keep alive in captivity. Their principal food consists of insects, earthworms, grubs, etc. The birds scratch up the ground like fowls, which makes their presence known.

They are very local, and one pair of birds will keep to their own particular part of the gully; but it is generally difficult to catch sight of them, as both their hearing and sight are very keen; but by sitting still in their neighbourhood, one would occasionally have them pass within sight. And when I have been so seated, they have come within a few feet, scratching and feeding; and although they kept one eye on me, as it were, they did not seem at all alarmed as long as I remained still, but directly they saw any movement they darted lightly away and were quickly lost to sight in the undergrowth.

Each male has one or two playing places, a circular patch of ground about six feet across, scratched and slightly raised, and here it is that they generally spread out and raise their tail, strut about and imitate the various sounds they hear. Sometimes there are two males on the same mound.

On ordinary occasions the tail is carried low and closed. They are wonderfully active in going over the scrub-covered ground, lightly hopping or half flying, if need be, over the various logs, etc., and they make no noise when so doing.

My friend Mr. E. A. Kitson has written some interesting notes on these birds, which were published in the "Emu", and I cannot do better than quote some of them:

"On one occasion only was I fortunate enough to see the birds dancing. This was on the top of Mount Wild Boar, in Victoria, about 8 o'clock on a foggy morning. When quietly walking alone along a track,

I suddenly heard and immediately saw two male birds performing on one of these grounds. They were alternately advancing and receding, turning, bowing, whirling, hopping, and running about the ground. While doing this they raised and lowered their tails repeatedly. Sometimes they put their heads through their raised tails, and turning them, seemed to be admiring the lyre designs thereon. At the same time they were, in rather subdued tones, whistling beautifully, and mimicking all the forest birds. One female bird quietly walked round the dance, making a few short hen-like notes, and pretended to pick up a grub here and there and to be unconcerned about the dance.

She, however, cast occasional glances at the male birds and was doubtless making her choice of a mate.

In November, 1890, when returning to Harrietville from Mount Feathertop (6303 ft.) in the Aus-

tralian Alps, in Victoria, I saw between twenty and thirty male and female Lyre-birds on the stunted snow gums (*E. pauciflora*) on the high ridge running from Feathertop and separating the Ovens River from Snowy Creek. They were at an altitude of about 5700 ft., and near the timber line. It was nearly sunset when I was surprised to hear a medley of melodious sounds, as if all the birds in the bush were singing their best and loudest. Being alone and on foot, I was in their midst before they noticed me, but to my surprise, they not only remained jumping about the trees, or with heads inclined watched me from the branches, but many of them continued their unsurpassable mimicry of other forest birds. The female birds imitated other notes equally as well as the males."

Mr. S. McNeilly, of Drouin, Victoria, informs me that he has had one of these birds, a male, in captivity for twenty years. For the first ten



Plate 2

Lyrebird on Dancing Mound.

years it was free about the garden, but the subsequent ten years was in confinement, and it was six years before it got its full tail, which it moulted every November. Its food consisted of grubs, beetles, earth-worms, etc. He was a wonderful mimic, and, being called "Jack" and often getting in the way, his favourite saying was "Look out, Jack". Mr. McNeilly says he could mimic almost anything, the human voice, violin, piano, cornet, cross-cut saw, also pigs squealing, dogs barking, child crying, and any of the sounds heard about a farm. He imitated a Laughing Jackass splendidly and when anyone said to him "Poor Jack", his answer was "Not poor Jack, fat Jack." Mr. McNeilly also had a hen bird for six years, when she was shot by some people passing by.

Another bird which lived mostly on the ground and scratched for its food like the Lyre-bird was the Coachwhip bird, and we never tired of listening to its clear long-drawn note, which ended in a crack, like a whip, the latter note being made by the hen bird. They were also very local and kept to the densest scrub, and built their stick nests some two or three feet from the ground, generally in a tangled mass of vegetation.

One often notices that the birds that make their home in the dense scrub and gullies are almost invariably of sombre hue, as the Lyre-bird, Coachwhip bird, Sericornis, Pilot-bird, Gerzgone, etc., and they mostly live on or close to the ground, whereas Cockatoos, Parrots, Kingfishers, and most other bright plumaged birds are found in the open forest country.

In the thick forest Gang-gang Cockatoos, with their dark grey plumage and red crest, were often heard, but they lived almost invariably in pairs and nested in the hollows of the

highest trees and seemed to feed on the seeds of the Eucalyptus and other trees.

Our friend the Laughing Jackass, or Kookaburra, was of course not absent, and his cheery notes were frequently heard, especially in the morning and evening. But I am afraid they have a weakness for other birds, as we had turned out two pairs of European Blackbirds, in the hope that they would increase, but in watching them shortly after enjoying their freedom, and picking up food, a watchful Kookaburra flew down from a neighbouring tree and, darting at the unfortunate blackbird, struck it heavily with its powerful beak and then carried it off triumphantly. We saw another of them attacked in a similar manner, and the other two disappeared the same day, probably from the same cause. The Jackass evidently strongly objected to black newcomers and preferred "White Australia".

Since then I have known these birds empty many nests of their contents, either eggs or young; they are as bad as cats in this respect. But they lived principally on Yabbies, which they seemed to entice within reach by gently tapping the entrance to their burrow. When one came up to investigate he was promptly seized by the bird, who battered it on some favourite stump or branch.

Lizards and Snakes were also appreciated, and we saw a small one of the latter seized by one of these birds, and when carried some distance in the air, dropped, and the process was repeated several times. The bird then struck the head with its sharp, strong beak many times and soon killed it, flying away with it to make a repast undisturbed; but they cannot manage any but comparatively small Snakes.

Mr. James Ramage, of Berwick, informed me that he came across a Laughing Jackass which had partly

swallowed a Snake about two feet long. The tail of the reptile was coiled round the bird's neck, and prevented its flying. The Kookaburra was vigorously trying to swallow the rest of it.

Mr. C. Barnard, of Queensland, also found a Laughing Jackass on the ground that had half swallowed a Snake. The bird could not fly, so he caught it, pulled the Snake out, and then set the bird free again.

The average length of Victorian venomous snakes is a little over three feet, although occasionally Black Snakes measure six feet.

But to return to our Jackasses — on several occasions I have noticed them redeem their character as Kingfishers, by catching a small fish in very shallow water. They then flew up into a neighbouring tree and vigorously dashed the unfortunate fish against the bough, and when it had been killed and well battered, swallowed it. I am afraid they are omnivorous as far as meat diet is concerned, and it would not be wise to place them in an aviary with small birds.

They lay their roundish white eggs in a hollow in a tree, and it is astonishing how quickly the sitting bird can hear anyone approaching and quietly fly off, frequently unseen. They are easily tamed and are capital for catching Mice.

I have known one of these birds to dash through a closed window into a room on being chased by a hawk, and on being frightened by the people in the room, dart at another window, and breaking the glass, make its escape apparently unhurt.

The Black-backed Magpie was only noticed here after the timber was cleared away, as, being principally a ground feeding bird, it is not found in forest country with thick undergrowth.

We occasionally heard the blood-curdling screech of the Powerful Owls, but their usual note was a kind of "hoot". They were large birds and killed Bandicoots, Rat-Kangaroos, and fair-sized birds for prey.

The Boobook Owl was of course common, and its cuckoo-like call often heard, and no two birds ever seemed to utter their call in exactly the same key. When I first heard it I thought it was the Frogmouth, but noticing one uttering its note in a dead wattle tree, on a clear moonlight night, I shot it and found it was the Boobook.

Regarding the Boobook, I may quote an interesting paragraph from a MS. of the late John Cotton, my grandfather: "When the gloom of evening is spread over the face of the Southern Hemisphere, and the Australian forests are pallid in shadow, when the Opossum emerges from its lurking place in some hollow branch and the several species of Flying Squirrels may be seen leaping from branch to branch, or from tree to tree, supported in their aerial flight by a membrane extending from limb to limb on either side, their lengthy tail clothed with long, soft fur, floating in their wake; when the Native Cats are prowling in search of food, when the Bandicoots and other animals that love darkness rather than light are abroad, a small Brown Owl may be heard from his perch on some dead branch or stump, giving notice to his companions of his whereabouts by a peculiar deep-toned call resembling the words "mo-poke, mo-poke", or as some persons are pleased to imagine "more-pork", at short intervals. Here this little muffled Owl may be seen, with all the gravity of a small judge, casting his capacious glance around, intent on pouncing on any unfortunate insect that may happen to stray within his ken, his large ears

also open to catch the slightest vibration of the sound of any prey near at hand. The name by which this bird is known to the Goulburn River tribe of aborigines is 'Go-goan'."

This was written in 1846, about the time that Gould wrote his folio work, and shows that in those early days of the colony this owl was called the "Mo-poke", and not the "Frogmouth" or "Podargus"; the latter bird was sometimes called "More-Pork" in Tasmania, according to Gould.

Those kept in confinement in the Melbourne Zoo can also be heard calling occasionally.

The Frogmouth is a much heavier bird and as a rule silent, its principal note being a kind of running croak, difficult to describe.

Mr. N. Falkiner told me that one used to roost at Moonbria Station, in New South Wales, in a willow only six feet from his window for two years, and he states that the only note he ever heard it utter was a repeated low guttural grunt; its mate roosted in a neighbouring tree.

Gould describes the sound uttered by this bird as a "loud hoarse noise, consisting of two distinct sounds, which cannot be correctly described", and that of the Tasmanian bird "the extraordinary sound of its hoarse unearthly cry, which resembles the word "more-pork".

Mr. C. McLennan, who has had wide experience with the Frogmouth in Victoria, states that from the cry of that bird he can make out the sound "mo-poke", but that it is much longer drawn out than the cry of the Boobook owl, and therefore easily distinguished.

They are wonderfully protected by their coloration, both birds being almost similar, but the male occasionally has a more reddish hue, especially in Northern Australia. They generally sit lengthways on a thick branch, and

remaining perfectly still, stretch their head and beak straight out, and so from even a short distance look exactly like a branch broken close off, and consequently are, as a rule, passed unnoticed.

Their stick nest is situated on a horizontal branch, and when sitting on their elongated white eggs, they assume the same curious attitude, should danger threaten. I remember a Doctor and myself finding one of their nests in an old Eucalyptus tree, situated about twelve feet from the ground, and my companion remarked that some boys had evidently found the nest first and had thrown a stick across it, but on climbing up, we saw the supposed stick fly away! The bird evidently knows that by assuming that stick-like attitude, and remaining still, it will escape observation, in the same way that some other birds do, notably the Bittern.

The male Frogmouth seems to sit on the eggs during the day, and the hen at night, but so far I have never yet found a hen sitting during the day; but this is the habit of many birds, such as the various Australian Pigeons, Herons, Bustards, Plovers, Crows, and other birds.

As far as I can judge, it seems that if the male and female are both protected more or less by their colour, the male birds will, as a rule, sit, anyhow during the day, and not the female.

The same applies to Emus, both birds being much alike and protected by their sombre hue.

We always have to remember that it is the back of the bird that is protected, not the breast, as the protection is from birds of prey, which fly overhead; therefore, many of the fruit pigeons and other birds have brightly coloured breasts or white underneath, but, as that is always in shadow, it is immaterial. The same generally ap-

plies to animals. When a White-plumed Honeyeater or Greenie utters its note of warning on catching sight of a bird of prey, it is astonishing how quickly all birds within hearing dash into the nearest bush for cover, and even imported birds, such as Sparrows, soon learn to do the same thing.

Most of the old White Eucalyptus trees in the gullies and similar places have fire marks on one side, whereas judging by the size of the present

undergrowth, it must have been many years ago since a bush fire swept through these dense damp gullies. It may have been on Black Thursday, February 6th, 1851, or possibly long before. Some of the trunks are very large. One that had fallen and been partly hollowed out by fire was six feet across inside at the lower end, and we could easily walk into its interior; and to climb over a fallen tree was often a matter of difficulty.



Plate 3

The fern gullies were always a delightful place to visit on a hot day . . .

These old monarchs of the forest now laid low were probably many hundred years old before their fall, and it reminds us how young Melbourne is when compared with them.

Occasionally a tall dead tree would be partly hollow, and a fire lighted at the bottom would soon find its way through to the top of the hollow, the draught quickly making it into a roaring furnace. On a dark night it was a beautiful sight to see the showers of bright sparks wafted into the air and the whole scene lit up by the glare. It was a favourite sight to show visitors from the city.

The Fern Gullies were always a delightful place to visit on a hot day, as no sun penetrated through the ferny covering, and there was always a cold stream close by; the ground, too, was free from short undergrowth, except ferns of various kinds.

There was always occupation, such as hunting in the rotten logs for various kinds of insects, killing a Mosquito now and again, and looking out for land Leeches. Frequently these troublesome insects had half filled themselves with one's blood at the ankle before being noticed, and an irritating wound would be the consequence. They always seemed thin and hungry, and would start off for anyone moving near them, in their loop-like mode of progression.

The delicately coloured Rose-breasted and Yellow-breasted Robins also built their beautiful nests in these localities, and those of the former are probably the most picturesque of any of our Australian birds, being largely composed of green moss and ornamented with pieces of lichen, while the latter frequently hang strips of bark on their nests, fastened on with cobweb, presumed to make the nests look more like their surroundings and so escape detection.

These birds are very cheery and fearless, and are a common sight. They are plentiful in southern Victoria, but are only found in thick scrub.

On one occasion when I was taking a photograph of a nest and eggs, the parent bird settled on the nest in the middle of the exposure, and consequently appeared in shadowy form.

Birds of prey were not plentiful; they rarely seem to be in thickly timbered country, but occasionally the Wedge-tailed Eagle would be noticed soaring aloft.

As the country became cleared, and consequently more open, Kestrel and Brown Hawks appeared. The former, which nested in hollow trees, seemed to live on insects, such as grasshoppers, beetles, etc., and never interfered with the chickens; but a Brown Hawk on one occasion was caught eating the contents of a hen's egg. I am not sure whether he made the hole in it himself or not, but judging by appearances, he had. These birds, as far as I know, rarely take eggs, but there are plenty of other birds that make up for them, especially crows.

In some places the scrub was very dense and matted together with wiregrass, and it was difficult to get through.

In the more open country there was abundance of beautiful wild flowers in the spring, and some of the gullies formed an ideal camping place, both for the botanist and zoologist.

Bird life was also abundant, and some of the gully Tree ferns were very large. Occasionally I came across specimens around which I could not make my hands meet. The Hill fern sometimes grew sixty feet high, but that was exceptional.

The Acacias were very plentiful, and the mass of yellow bloom that

clothed the hillsides in the spring was a beautiful sight, especially blended as it often was with many other shrubs in flower.

My only experience in getting "bushed" was in this district. I had visited a hill from which a very beautiful and extensive view was to be obtained, and stayed rather too long, and on my way back through the trackless forest, darkness came on. I was thoroughly wet with heavy showers and with passing through dripping scrub, and at last could go no further with safety, the darkness under the forest trees being so intense. Fortunately I had matches and a tomahawk, and, by the help of dry bark, which was difficult to find in the rain, got a fire alight, and kept it up all night. I then cut two sheets of bark off a fallen tree and placed one on the ground on two cross logs, in case soldier ants should wish to pass that way, and the other I placed over me, as a protection from the rain. I used to stand by the fire till I got well heated, and then lie down on my back until I got cold again, which did not, as a rule, take long. When daylight came I was enabled to find my way to my destination.

My late father told me that, on one occasion he was camping out on a cold frosty night, and when he awoke in the morning, he felt his face held together in some way, and on opening his eyes saw a large hairy tarantula spider resting and apparently enjoying the warmth of his breathing, but it did not stay there long when its presence was discovered.

Only on one occasion did I find a specimen of the Giant Earthworm. It was two feet long without being stretched, and about as thick as my finger, and when held up stretched out to the length of six feet.

Land Crabs, or, as they are popularly called, Yabbies, were very plentiful. The larger variety lived in the creeks, its holes being under logs in the muddy bottom; and the smaller kind made deep holes wherever the soil was sufficiently damp. The various tunnels generally joined, forming a network difficult to follow up with the hope of obtaining the occupants, as they had so many ways of escape. These crustaceans were rarely seen during the day, except in very dull or rainy weather. They were the favourite food of the Laughing Jackasses.



Plate 4

Land Crabs . . .
. . . The larger
variety lived
in the creeks . . .

Mineral and Rock Displays in the National Museum of Victoria

by

Dr. A. W. BEASLEY*

On joining the staff of the National Museum of Victoria in 1950, it was found that virtually no changes had been made in the Mineral Gallery exhibits since they were set up about 50 years previously, after the Museum was moved from the Melbourne University grounds and established on its present site. Specimens were exhibited in display cases of different styles, and the exterior of every case was painted black. Overhead lighting was very poor and there was no internal illumination of display cases. Almost all of the specimens on display were of high quality and well worthy of exhibition, but their presentation was generally unattractive. Moreover, there was a lack of instructive or teaching series of exhibits. It became clear that a complete reorganization of the Mineral Gallery was required.

It is now some years since all of the old exhibits were dismantled and new displays were set up on the northern and western sides of the gallery surrounding the McCoy Hall. As most people visit a museum to see the exhibits, considerable effort has been put into making the displays of minerals and rocks as attractive and informative as possible. To keep the exhibits up-to-date and abreast of modern display techniques, it has been necessary to dismantle a number of the exhibits twice during the past 20 years and to set up new exhibits on the same topics.

It is true that many people visit the Museum mainly to be entertained, but it is clear that increasing numbers come primarily to learn. No doubt this increase is partly due to greater

public interest in geology. The great importance of the mineral industry in the Australian economy has certainly become apparent during the past 10 years, and more attention has been given to geology in school curricula.

To cater for the serious student and others who wish to learn in a systematic way, several teaching series of exhibits have been set up. A series of 16 inclined table cases, placed adjacent to the east-west balcony rail, has been set up as an **Introduction to the Study of Minerals**. This is followed by a display of **Rock-Forming Minerals**, arranged systematically in a series of 13 inclined table cases. On the western side of the gallery an **Introduction to the Study of Rocks** has been set up in a series of 10 similar-style cases. Following on from this introductory series a **Systematic Display of Rocks** is at present being assembled in 10 inclined table cases. Special effort has been put into making these series of exhibits as simple and concise as possible and attractive to the eye, so that the public may become interested in them and their interest held. Use has been made of coloured label-card and plastic letter headings, and the printed labels have been graded through the choice of various type sizes. So that the teaching series can be located readily, internally illuminated plastic label signs have been erected overhead, and label signs have also been affixed to the balcony railing closer to eye level.

Minerals can be classed into rock-forming minerals, economic minerals, and gem minerals. This grouping has

*National Museum of Victoria.

been adopted in arranging the main mineral displays in the Museum, instead of arranging a large display according to the Dana system of mineral classification.

Economic minerals are displayed in upright cases adjacent to the northern wall and extending partly along the western side of the gallery. With the exception of gold, all of the mineral specimens in these exhibits are from Australian localities. Displays are arranged according to the principal metal that the minerals contain; for

example, the exhibit dealing with copper in Australia contains specimens of all the important copper ore-minerals. These exhibits cater particularly for the student of economic geology, the prospector and mining person. They contain information concerning the mode of occurrence and distribution of important deposits of the various ore-minerals in Australia. Three display cases are devoted to gold, including one dealing with gold in Victoria; the latter exhibit contains a piece of the famous



Plate 1

Part of the Mineral Gallery of the National Museum of Victoria.

Photo:
E. Rotherham

Welcome Stranger nugget. Gold has such a strong appeal to the public, that these exhibits are among the most popular in the Museum. Models, diagrams and photographs are incorporated in the exhibits of economic minerals, to make their presentation more graphic and instructive, and movement is provided by displaying some specimens on revolving staging mounted on turntables.

Gem minerals and ornamental stones are exhibited in an especially designed display unit centrally situated on the northern side of the gallery. Special exhibits of opal and agate are included in this unit and, in a darkened inside area, there is a large exhibit of fluorescent minerals. Short wave and long wave ultra-violet lamps are used in the latter display and, by the use of an automatic time-switch, the minerals are also seen under ordinary incandescent light. The glow and vivid colours of the minerals under ultra-violet light contrasts dramatically with their appearance under ordinary light, and the exhibit has a strong fascination for most people.

A double-sided island case on the northern side of the gallery features mineral specimens from Australian localities on one side and specimens from Victorian localities on the other side. A similar-style display case nearby contains exhibits of minerals from overseas localities. A large number of the specimens in these exhibits were obtained during the early days of the Museum, and in many cases similar specimens could not be collected now because the localities have been worked out. Some particularly fine crystallized specimens and specimens of rare minerals are included in the displays.

To serve as an introduction to the displays in the Mineral Gallery, an exhibit of large and spectacular speci-

mens has recently been set up in the Spencer Hall, on the ground floor adjacent to the Russell Street Entrance of the Museum. This exhibit is seen by most people who visit the Museum.

Various aspects of the geology of Victoria and the results of geological processes are depicted in five dioramas in the Mineral Gallery. They show on a reduced scale a limestone cave at Buchan, the results of weathering of granite at Stonehenge, Mt. Buffalo, an extinct volcano (nested caldera) known as Tower Hill, near Warrnambool, rock stacks called the Twelve Apostles, near Port Campbell, and a large gulch known as the Grand Canyon in the Grampians. In a panel at the side of each diorama are displayed rocks from the various areas, together with photographs, geological maps, sections and labels.

Close to the Grampians diorama there are displayed two large slabs of ripple-marked sandstone of the Grampians Group. These outstanding specimens came from near Woorndoo, and were donated to the Museum about 70 years ago.

Special consideration is also given to Victoria with displays featuring specimens of limestones, coals, granitic rocks, and volcanic ejectamenta from Victorian localities. These exhibits, which are on the northern side of the gallery, in double-sided island cases, contain overall descriptive labels and geological maps.

An exhibit of meteorites and australites, which includes a 1½ ton piece of the Cranbourne meteorite, has been set up in the south-western corner of the gallery. This is followed by a sequence of general geological displays in seven upright cases. They deal with the origin and internal structure of the Earth, the rocks and structure of the Earth's crust, igneous rocks, sedimentary rocks, metamorphic rocks, Earth movements (folds,

Plate 2

Some of the teaching series of exhibits in the National Museum of Victoria.

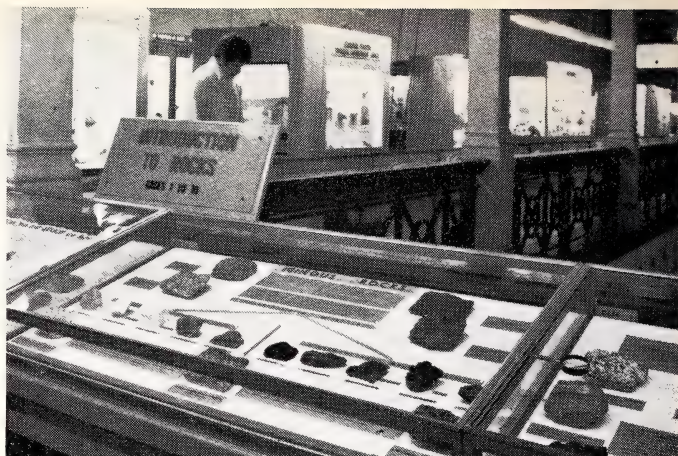


Photo:
E. Rotherham

faults and joints), and geological curiosities (concretions, spherulites, dendrites and fulgurites).

Also on the western side of the gallery is displayed a large polished slab of orbicular granite from Karama, New Zealand. This very rare variety of granite contains "orbs" consisting of alternating concentric zones of black mica (biotite) and white oligoclase feldspar embedded in a matrix of normal granite.

To help make the Mineral Gallery

brighter and more attractive, extensive use has been made of fluorescent lighting both over and inside display cases, and the interior of many cases has been painted in bright colours. It is hoped that the public will derive interest and pleasure from the mineral and rock displays in the Museum, and that they will want to return. To encourage a desire to return, changes are made in the displays and different specimens are placed on exhibition, so that there is something new to see.



Plate 3

An exhibit of overseas minerals in the National Museum of Victoria.

Photo:
E. Rotherham

Readers' Nature Notes

Jean Galbraith of Tyers, in Gippsland, sent these two interesting, but widely different, notes.

Butterflies

In October two members of La-trobe Valley F.N.C. (our Hon. Sec. Mrs. Peterson and I) recently visited another member at Wangaratta South. During the week we were there we saw more Caper Whites than any of us had ever seen before. Both in the Warby Ranges and at Power's Look-out above Cheshunt they were in dozens, flying past so lazily that it was easy to catch one by hand, examine it, and release it unharmed. Mrs. Peterson did this several times.

We are not entomologists, and I can name under a dozen species of butterflies at sight, but recollection of a plate in McCubbin's *Australian Butterflies* made me fairly sure of the species. The leisured flight and broad white wings shading into black at the edges suggested an Imperial White, the "Mistletoe Butterfly", but instead of the bright red, yellow and black underwings of that species the under side of Caper White wings has a lacy pattern of black and white with some inconspicuous yellow shading. Reference to the book later showed that our naming was correct.

The flocks of slow-flying butterflies were very beautiful although I doubt whether we saw more than two dozen at one time, a small number compared with flocks of many thousands reported from N.S.W.

According to the article in *Australian Butterflies* it is usual for them

to migrate to Victoria from the north where the food plant of their caterpillars (*Capparis* spp.) is native to Queensland and N.S.W. The flocks are largest in November and December. There are relatively few *Capparis* trees in Victoria but Caper Whites do breed here. One wonders why, with their eggs laid safely on the northern Caper Trees, they should migrate to Victoria to die; for that is what happens in most cases. Are they looking for Caper Trees—which few must find here? At the same time other flights—the very large flights—go north to Queensland where *Capparis* trees of over a dozen species are widespread. Perhaps some of ours go north again, but most do not return to the warm regions where *Capparis* grows.

Powerful Owl call

The call of the Powerful Owl is regarded as one of the most terrifying sounds of the Australian Bush, although the bird is harmless to anything larger than Greater Gliders.

I have been interested to note that although Powerful Owls live here—I have seen one outside my window three times during the past two years—I have never once heard the bird's scream—or indeed heard any sound from it at all.

Some diversity of opinion has existed over the species of owl which utters this "terrifying scream"; however it seems now (according to authoritative sources) that the species responsible for it is the Barking Owl (*Ninox connivens*). The normal call which the Powerful Owl utters is a mournful "Woo-hoo". [Ed.]

Needed Urgently

The Editor is in need of smaller articles to help in making up the normal content of the *Victorian Naturalist*. Surely something of interest is seen on the many excursions undertaken by members.

reptiles of victoria - 11

by HANS BESTE

Plate 21

Leiolopisma guichenoti — Common Grass Skink.

A small brownish-grey skink, common near built-up areas.

Length: to 4 inches.

Head pointy. Ear-opening distinct. Eyelid movable. Five fingers and five toes. Legs well developed. Colour brownish-grey to grey-olive; very variable throughout range. Dark blotches on back and sides. Pattern has marbled appearance. A black line along side of body (dorso lateral stripe). Head metallic brown, often bright copper.

Habitat: among debris, fallen logs, low vegetation, also near houses and along creeks in forested areas.

Best distinguishing features — movable eyelid, marbled pattern, coppery coloured head.

Plate 22

Sphenomorphus quoyii — Water Skink.

A robust skink, found usually near water.

Length: to 12 inches.

Head slim, long and hardly distinct from body. Ear opening large and distinct, eyelids scaly. Five fingers and five toes (2nd outer, of latter, greatly lengthened). Very brightly marked with yellowish-gold and black. Sides, from behind ear opening to hind limbs, black, with white spots. Upper golden, with black spots. Tail longer than body and tapering to a point.

Habitat: along water-ways of the high alpine country and the Murray river system of this State.

Best distinguishing features — shape and markings. However, two similar species are easily confused with this species and specimens must be identified with care. The very similar *S. tympanum* (two forms) is more subdued in its colouration; the golden markings are more of a dull copper. The snout of the latter seems also more rounded. (*S. tympanum* is the common species in Gippsland and around Melbourne.)



Plate 21



Plate 22

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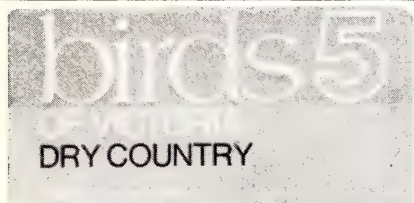
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The Origin of Generic Names of the Victorian Flora

Part 2 – Latin, Greek and Miscellaneous

by JAMES A. BAINES.

***Aloe** The old Arabic name of this African genus, which is pronounced in three syllables as a botanical name but in two as an English common name. These succulent garden escapes often persist on railway embankments and elsewhere.

Alopecurus Gk alopex, fox; oura, tail. The common name, foxtail, probably existed when Linnaeus named the genus, using a Lat. form of the Gk term.

Alsophila Gk alsos, a grove; philos, loving, in reference to shade-loving treeferns now called *Cyathea*.

Alternanthera Lat. alternans, alternating; anthera, anther, alternate anthers in these flowers being barren. (Joyweed.)

***Althaea** Gk althaia, a cure, in allusion to the use of some species in medicine. (Common Hollyhock is a garden escape that often persists for years.)

Alyssum. Gk alysson, from a-, not, lyssa, raging madness. Madwort was a herb used as a specific against madness and the bites of mad dogs. **A. maritimum* (Sweet Alice) is now *Lobularia maritima*, but *A. linifolium* is a native.

Alyxia. Jaeger derives this from Gk alyxis, an escape or avoiding; Smith and Stearn from Gk halusis, chain (apparently referring to the fruits). The common name of our Victorian species, Sea Box, comes from the specific name *buxifolia*.

Amaranthus. Gk amarantos, unfading. Only one of the nine species in our

flora is native, *A. grandiflorus*, the introduced species including Love-lies-bleeding, **A. caudatus*. Properly Amaranthus, -thus spelling coming from confusion with -anthus, flower.

***Ambrosia.** Gk ambrosia, food of the gods; lengthened form of a word meaning immortal. **A. psilostachya* is Perennial Ragweed.

***Ammi.** Gk ammi, name of an African plant (from Gk ammos, sand). **A. majus* is Bishop's Weed.

***Ammophila.** Gk ammos, sand; philos, loving. As a sand-binder, Marram Grass lives up to its 'sand-lover' name.

Amphibromus. Gk amphi, about; bromos, oat. The prefix amphi- is used to denote relationship, Amphibromus being close to *Avena*, the oat, much closer than to *Bromus*, Brome Grass.

Amphipogon. Gk amphi, both; pogon, beard; both flowering glume and palea having ciliate awns.

Amyema. This genus, named by Van Tieghem, included tropical African species, so this French botanist could have named it after Amyema in Chad (formerly French). Barlow in his monograph on the Lorantheae (1968) placed those in a separate genus from ours, which used to be *Loranthus*.

Andropogon. Gk andros, genitive of aner, man; pogon, beard; in reference to the hairs on the spikelets of some species. Silky Blue-grass (*A. sericeus*) is now *Dichanthium sericeum*.

To be continued.

Field Naturalists Club of Victoria

Latrobe Valley F. N. C. Report.

President: Mr. T. Moretti.

Hon. Secretary: Mrs. Iris Peterson,
14 Barry Street, Morwell 3840.

Members have enjoyed an active and interesting half year. Authoritative speakers have dealt with a variety of subjects which included Petrology, Botanical Surveys, Bird Study, Ferns and Fern Keys, Algae, Fungi and Forestry. Where possible the monthly excursion was led by the speaker and such outings were always well attended. Members have given talks to other clubs and organisations and have acted as leaders during the weekend.

Field Survey Group.

November Meeting.—The November meeting was attended by 20 members and friends, and as it was a members' night, many interesting and varied topics were discussed; and a number of excellent slides on a wide range of topics were shown. These included some excellent ones from Mr Tom Sault. As this was the last meeting for the year plans for the Christmas camp to the Dargo area were also discussed. The meeting closed, as usual, with coffee and biscuits.

December Camp.—Eleven members and friends attended a very dusty but

The December number of the Latrobe Valley Naturalist will be the 120th issue. A complete index has been compiled and is available for 20 cents. The club is also building up a very useful library.

The club weekend at Wilson's Promontory in October has become an annual affair. This year members had the pleasure of meeting Geelong Club there and at their invitation shared the Saturday night's entertainment with that club. Members are looking forward to the annual campout in January which will be held on the Bogong High Plains.

rewarding camp in the Gisborne Blackwood area on the eighth and ninth of December. Although there were no individual important finds on the camp the results proved valuable for the mapping of flatworms, both terrestrial and freshwater, other invertebrates and liverworts. The camp also tended to confirm previous results from the mapping of the distribution of frogs. Of special note was the unusually large number of Damselflies, and midges in particular, as in some areas the ground surface and plants were covered with the tiny insects, almost making them appear black.

Western Victorian F.N.C. Association

Report of Clubs' Activities for year 1972

DONALD H. & N.H. GROUP

President — Not given. **Secretary** — Mrs. H. Falla.

Possibly to our Group the most important event this year has been the proclaiming of the Mt. Jeffcott Flora Reserve with R. P. Falla as its inaugural Chairman. Our late respected member Mr. James Barrance worked long and patiently to have this area reserved, and to our members this is the culmination of those years of endeavour. The natural history side of our group this past year has been directed towards Mt. Jeffcott, with regular visits to the area by individual members and the identification of plants. It is pleasing to note that six orchids have now been found on the Mount.

GEELONG F.N.C.

President — Mr. John Hunt. **Secretary** — Mr. G. McCarthy.

The monthly meetings were well attended, averaging about 130. Monthly excursions, two by chartered buses, were also well attended by upwards of 100. Junior meetings held before the general meetings were attended by an average of 25 to 30. The general week-end camp outs were well patronised; one to Port Fairy for mutton bird banding; to Steiglitz area, alpine camp out to Mt. Baw Baw, and Mud Island for petrel banding. The Otway survey group also had a number of week-ends camping. The annual tree planting at the You Yangs was again undertaken. Conservation projects included Mt. Cole, Ocean Grove, Belmont Common swamp (which our club now leases) and Point Addis. The mailing list for "The Geelong Naturalist" is now 457.

HAMILTON F.N.C.

President — Mr. Chris. Baulch. *Secretary* — D. M. McKenzie.

Membership 29.

The year has been an interesting and varied one for our members, regular meetings being held, highlighted by some excellent speakers. Excursions took us to Lake Linlithgow, Mt. Eccles, rock paintings at Honeysuckle Creek, tree planting at Bryan's Swamp, Kentbruck Heath and the Chimney Pot. We were again able to have "Photoflora" in Hamilton and were treated to some of the best wildflower slides that can be seen anywhere; one of our members, Mr. Ellis Tucker, had two of his slides accepted in the exhibition. The Club also sent its recommendation following the report of the land Conservation Council on South Western Victoria. We look with hope towards sensible conserving of natural resources in this part of Victoria.

HORSHAM & DISTRICT F.N.C.

President — Mr. C. Kroker. *Secretary* — Mrs. Jean Hill.

Meetings are held in the Horsham Technical School on the 4th Thursday of each month at 8 p.m. Activities included visits to Horseshoe Bend, Dimboola, Natimuk Lake and the Smith Memorial Sanctuary. Monthly meetings were enjoyed with guest speakers Ian Petersen, Fred Davies, Mr. A. E. Lindner, Owen Thomas, Miss Thelma Bond and Miss Isobel Slater. A number of members also contributed. Several matters of conservation were supported during the year by letters of protest to Parliamentary members. The children's essay prize night was featured on BTV 6 when nature book prizes were presented and winners made honorary members.

MARYBOROUGH F.N.C.

President — Mr. Brian Johns. *Secretary* — Mrs. E. Courtney.

Membership 91 adults, 11 juniors.

The Club meets on the first Monday in the month at the Maryborough High School. Average attendance at meetings and excursions has been in the mid-thirties. A submission requesting an appropriate permanent reservation of Maryborough's box/ironbark State forest was compiled and presented to the Land Conservation Council and Forests Commission. A special evening was sponsored as part of the Golden Wattle Festival programme, with Mr. J. Ros Garnet as guest speaker. We were asked by the committee of the Golden Wattle Festival, the Agricultural Society and the Dunolly Gold Rush to arrange a display of natural history items as part of their programmes, and we co-operated with each of these bodies. Our twenty-first birthday was celebrated at the September meeting.

MID-MURRAY F.N. TRUST

President — Mrs. Norma Irwin. *Secretary* — Miss G. Willoughby.

Membership 33 adults, 8 juniors.

General meetings, executive meetings and excursions were held regularly each month; our annual camp-out was held at Rankin Springs, N.S.W. Major Mitchell Lagoon is now a Forests Commission special purposes reserve. It was confirmed that *Melaleuca decussata*, a southern species is growing in the eastern Mallee on the edge of a salt pan; a salt bush was found with bright yellow winged seed-pods, not recorded for Victoria. We paddled in the swamps on a hot afternoon, looking for fresh water snails for National Museum research; we built a large herbarium cupboard (with many narrow shelves) to house dried specimens. We had talks about Mallee land systems and salt and water table problems; our native fish and their breeding requirements; the kangaroo problem when thousands and thousands invade nearby river country, with hundreds being shot; and members contributed regular nature notes to the local paper.

PORTLAND F.N.C.

President — Mr. G. Baker. *Secretary* — Miss Joan Collishaw.

Meetings and outings were held monthly. At each meeting the subject was illustrated with slides, as follows: Mr. Davies, trip to U.S.A.; Mr. G. Baker, fungi; Misses Lineker and Rogers, trip to Japan; Mr. Beuglehole, botanical research in East Gippsland; Mrs. Davies, on Lord Howe Island; Mr. Wagner, on U.S.A.; Mr. Streeter, Australian birds; Mr. Jones, orchids; Mr. Baker, trip to Central and Northern Australia. Outings took us to Bridgewater Bay, Tower Hill, Cape Nelson, Bulley Ras., Mt. Richmond, Nelson Bay, McKenzie's Crag and Kentbruck.

ROBINVALE F.N.C.

President — Mrs. K. Grose. *Secretary* — Mr. John R. Curr.

Membership 19 adults, 19 juniors.

The year 1972 was possibly the most successful year for the Club in that it has been more active than previously. Excursions have been held at Tammit Station in N.S.W., Belchers Island, Margooya Lagoon at Tol Tol, Wemen, Wandown Reserve and Lake Benanee. Several general meetings have also been held, discussion being centred on the flora and fauna in areas of local interest, and conservation of areas such as Wandown and Margooya Lagoon. Several films were shown and members showed slides. Several members are also members of the Sunraysia N.R.T., and this has brought new ideas and energy into this Club.

STAWELL F.N.C.

President — Mr. I. McCann. *Secretary* — Mrs. E. J. Hughes.

Membership 19 adults, 3 juniors.

Thirteen day and half-day trips were held to local areas and six slide nights were given at Hall's Gap, for which a new projector was purchased. Members helped with Guides and school groups at Hall's Gap, and guides were provided for buses from a Victor train in October. Four sanctuaries are under our care; it is intended to fence the Three-Jacks Sanctuary.

TIMBOON F.N.C.

President — Mr. Kevin McQuinn. *Secretary* — Mrs. L. T. Coe.

Membership 35 adults, 1 junior.

The Club meets on the first Friday of the month at the Consolidated School, Timboon, at 8 p.m. and holds monthly excursions.

WARRNAMBOOL F.N.C.

President — Mr. R. F. Peirce. *Secretary* — Mrs. M. J. Yeoman.

Regular meetings were held; members themselves have willingly contributed to the success of the evenings with slides of educational interest and enjoyment. We were especially favoured by visiting guest speakers — Dr. Csordas, on his experiences as a doctor on Macquarie Island and showed slides of the bird and animal life of the Island. Mr. Seebeck interested us with insight into his research work as a field naturalist. Numerous specimens have been brought along for identification and comment. Outings have catered for the several interests of members, from beach walking, watching the mutton birds returning to their burrows, to forest areas and tree planting at Tower Hill. Some members have assisted in bird-banding. We closed the year with an exhibition of specimens in the Town Hall supper room in conjunction with the City of Warrnambool Gem Club.

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It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.



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Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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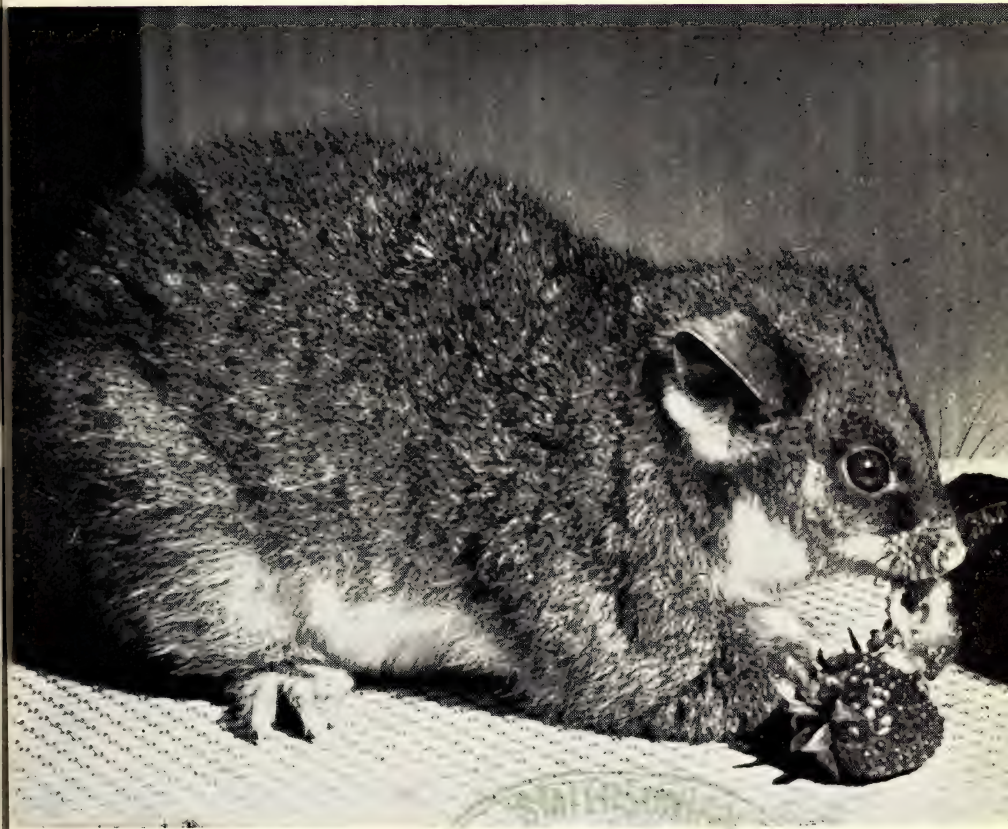
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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 11 February — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Subject for Evening — “Between High and Low Tide”: Mr. Dan McInnes.

New Members—

Ordinary:

- Mr. Brian E. Burbage, Flat 14, 74 Carlisle St., St. Kilda, 3182 (*Mammals*).
Dr. Murray J. Littlejohn, Department of Zoology, University of Melbourne, Parkville, 3052 (*Amphibia, Inertidal Marine Ecology*).
Mr. Kevin L. Reed, 269 Nepean Highway, Parkdale, 3194 (*Botany*).
Mr. Mark Tweg, 73 Evansdale Road, Hawthorn, 3122 (*Geology*).

Joint:

- Mr. Maxwell J. Campbell and Mrs. Faye E. Campbell, 5/270 Rossmoyne St., Thornbury, 3071 (*Field Survey*).
Mr. S. D. Chivers and Mrs. E. J. Chivers, 16 King St., Glenroy, 3046 (*Geology Microscopy*).
Mr. Fabris and Mrs. M. Fabris, 54 Dwyer St., Clifton Hill, 3068 (*Field Survey*).
Mrs. Jeannette P. Jolley, 5/7 Curtain St., Kingsbury, 3083.
Mrs. Robert S. Pinan and Mrs. Lucia Pinan, 6/32 Power St., Hawthorn, 3122 (*Botany*).
Mrs. Anita M. Tregear, 36 Austin Crescent, Pascoe Vale, 3044 (*Botany*).

Country:

- Mr. Greg. Daniels, 140 Nottingham Road, Lidcombe, N.S.W., 2141 (*Insects—Robber Flies*).
Dr. Colin Officer and Dr. Margaret Officer, 32 Anzac Avenue, Seymour, 3660 (*Botany*).
Miss Susan Robertson, 7 Culliver St., Horsham, 3400.
Mrs. G. M. Ryan, 53 Contingent St., Traralgon, 3824.

Wednesday, 13 March — Presidential Address and Annual Meeting.

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Thursday, 14 February — Botany Group. Members' Night.

Thursday, 21 February — Day Group meets 11.30 a.m. at the corner of Domain Road and Park Street, South Yarra. Inspection of succulents and cacti at Botanic Gardens Nurseries. Bring lunch.

Thursday, 28 February — F.S.G. Meeting in Conference Room, National Museum at 8.00 p.m. “Practical Aspects of Maps and Map Grid Work.”

F.N.C.V. EXCURSIONS

Sunday, 17 February — Kath Turnbull Research Station. The coach will leave Batman Avenue at 9.30 a.m.; fare \$2.00, bring one meal and a snack.

Saturday, 9 March–Monday, 11 March — Victorian Field Naturalists' Clubs' Association combined weekend at Stawell. A very good programme has been arranged for the weekend and it is hoped as many as possible will attend. A coach has been chartered and accommodation booked at the London Motel on dinner, bed and breakfast basis; cost per person for accommodation and transport \$30.00, to be paid by 28th February. The coach will leave Flinders Street, outside Gas and Fuel Corporation, at 8 a.m. — bring a picnic lunch.

There will be a short excursion, Saturday afternoon, departing from the Town Hall at 1.30 p.m. (assemble 1.00 p.m.) — an evening meeting at 8 p.m., when Dr. F. R. Moulds has been invited to speak on “Multiple Use of State Forests, with Particular Reference to Outdoor Recreation in the Grampians”.

Sunday (9.00 a.m.) — Full day excursion in Grampians, returning by 5.00 p.m., and a members' night at the Town Hall at 7.30 p.m.

Monday Morning — A short tour of Stawell then on to Deep Lead Gold Diggings for lunch and farewell.

Thursday, 21 March — Day Group outing will be an inspection of the Port of Melbourne by Harbour Trust launch. Please book with Mrs. Strong (56-2271) as a limit to 30 adults applies. Full particulars will appear in the *March Naturalist*.

Editor:

G. M. Ward

Assistant Editor:

G. Douglas

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Front Cover:

The Ringtail Possum in common with its "cousin" the Brushtail Possum, have not been overwhelmed by man's "progress"; and it is delightful to have them about, even in the suburbs.

The Editor has two which visit his garden frequently.

photo: John Goode.

Members who use the library will be pleased to know that by courtesy of Dr. Churchill it is likely to be back in operation shortly in a temporary location within the Herbarium. The long term future siting of the library is not certain, but its temporary home is expected to serve for some time.

As the club also has other needs for space it is watching moves by Conservation Council of Victoria to set up a State Conservation Headquarters which could provide services, and some accommodation to member bodies.

Funds are being provided by the Commonwealth Government through the Australian Conservation Foundation for the establishment of a Conservation Centre in each state. In Victoria the funds for this purpose have been offered to C.C.V. By March there should be some definite news of progress towards its establishment.

Also on the conservation front it has been proposed by our President, Mr. Peter Kelly, that the club should have a Conservation Group. Proposing this to the Council he said the club had in the past been most active in conservation, but over recent years had done little in that field. He thought it should be active in conservation and felt the establishment of a special group to concentrate on it would be the best way of reviving this work. A committee similar to that which initiated the Field Survey Group is to be set up shortly.

Gippsland Worms

by JOHN E. EVE

The following article appeared in the December 1973 issue of the Latrobe Valley Naturalist, and is reprinted here by kind permission of the L.V.F.N.C.

The writer has long thought that his house (built in 1906) stands on a hummock which has, over the ages, been built by worms. These small rounded hills are a feature of the area of Lillico, Warragul.

A diagrammatic north-south section of the site is shown (Fig. 1).

The soil in these mounds varies in a regular manner. The north-facing slopes are a deep dark brown fertile loam which carries a good sward of best grasses and clovers. It shows the "crumb structure" in the turf which is typical of a good pasture. The south-facing slopes are very different. The mode of change-over is gradual and the place of change almost impossible to see. The soil is clayey and hard-packed, and always rather bumpy on the surface. Light brown in colour and having the appearance of sub-soil. It cracks more than the other in a dry year on the higher parts, and in spite

of 20 years of effort, it will never carry a dense sward, nor many of the best pasture plants. Clover is only sporadic. It produces generally the native grasses, flat weed, sorrel and such like hardy species, and is always showing open soil. In his early days, the writer tried to get a man to "disc" it up for him, but it was said that discs could make no impression on it, they would only scratch the surface.

But strangely trees grow well; with Eucalypt, Blackwood, Cypress and Radiata Pine being common. Oak, Ash and shrubs also appear. One *E. globulus*, recognised as a fast-growing tree, planted in the position shown, grew at a very fast rate indeed and is now a fine young specimen with a trunk 8" or 9" through. Mahogany gums have done well. A row of young pines at "P" are very robust indeed on a particularly clayey area. They had difficulty in penetra-

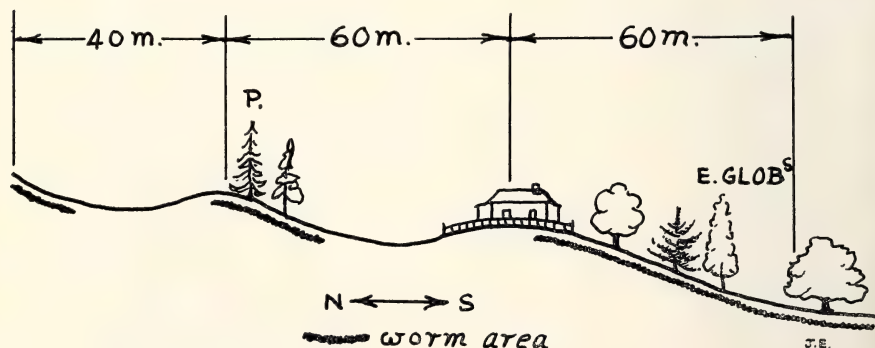


Figure 1

ting and getting a hold in the first few years. One was guyed for a year, and finally had to be cut out as it had no hope of standing on its own.

As regards pasture, probably the only thing which would have enabled it to carry a sward would be a deep sub-soil ploughing to loosen it all, followed by liming and fertilizing. This is based on the performance of garden beds.

It is on the southern slopes where the worms live. There is, except in a very wet season when you may find the odd hole, no sign of them on the northern slopes. On the south, they are fairly frequent, even close up to large trees. The holes are about 16 mm-25 mm diameter and on most nights the worms will bring up a little light brown watery soil and push it out on the surface—a tablespoonful perhaps each night. They are most active in wet weather, during the winter and early spring. The worm probably pushes its head (or its tail?—the writer's wife queries) out a little when it makes its "cast", but this has never been observed. There is certainly never any sign of its having come bodily out on to the surface as the small earth-worm does. In winter when there is plenty of water in the ground, worms seem to rest near the surface, because footfalls nearby will cause them apparently to withdraw downwards, causing sucking watery noises. It seems as if they are drawing back into water in the lower parts of their holes. Efforts have never succeeded in obtaining a whole worm, but when digging a post-hole from 0.75 m to 1 m deep, a piece a few centimetres long and about the size of a man's thumb has been severed.

Early in the spring of 1973 an attempt was made at following a hole down, but the worm hole deviated

from the other at 0.75 m, and the attempt was given up. However, a small piece of research followed. A piece of water piping, 25 mm in outside diameter was placed in the hole which was then gradually filled in around the pipe, filling and ramming the earth and withdrawing the pipe a bit at a time until an artificial worm-hole was made to the surface. For four days nothing happened; and then for three or four, the worm used the artificial hole and deposited quite an amount of cast. After that there was no activity for about a month when, after 3 inches of rain in late October, more cast was put out.

The layout of the worms' abode, as far as has been observed; and the way they inhabit these hummocks, has led the writer to hazard several guesses about them, which may be useful to record for checking against other findings.

The worms appear to live in colonies, but each worm may have a hole which is its own dwelling. How much communication there is would require deep and careful excavation to find out. I think probably water flows through part of the system and serves a double purpose—to keep the ground moist, particularly in summer; and to bring food. The food consists of decaying vegetable matter. It is doubtful whether they live on living vegetable or animal matter existing near the surface and near their holes, as no sign of any gnawed roots or other remains exists. During the summer they retreat to great depths and are never heard, but during the winter new holes often appear.

Their activities in bringing up sub-soil in their casts have the effect of building out the hummocks on the south side and probably reducing them by causing subsidence gradually on the north. Such low areas as that between the writer's house and the

hump to the north are thus formed. The subsided areas may act as catchments for a supply of water via tunnels to the south side of the hill.

It is possible that such a process has gone on for hundreds of years and that all the small hills in the area have been built or much modified in this way. Some of them where very little, or no worm activity occurs may have reached a state of becoming uninhabitable and thus have been abandoned.

A farm was once visited at Strzelecki, where the farmer showed us a rounded rough hillside on which he said he could get nothing much to grow. It was suggested to him — "It's a worm bed," and so it proved to be.

It has been said that these worms are found nowhere else in the world. It is therefore clear that their unique mode of life and their size are linked with the soil and climatic conditions of this area — deep clayey soils, heavy winter rains followed by warmish summers and a good supply of animal and vegetable matter in the soil or soil water. Their life and tunnelling systems will have evolved during the tertiary era. To convert surmise into certainty about the use the worm makes of his tunnels would be a difficult job. Because he works so deep, a great deal of earth would need to be very carefully moved. One way would be to procure a stay of execution of work, where excavations are to be made through a known worm bed.

The Origin of Generic Names of the Victorian Flora

Part 2 — Latin, Greek and Miscellaneous

[continued from 91 (1)]

by JAMES A. BAINES.

***Anagallis.** Gk name of the pimpernel. Agallis was the Gk name of the flag iris, but there is no resemblance between the two flowers. **A. arvensis*, Scarlet Pimpernel, is often at home among native vegetation, and the blue form, var. *caerulea*, less often.

***Anchusa.** Gk ankousa, alkanet or bugloss. Our introduced species is **A. capensis* (Cape Forget-me-not).

Angianthus. Gk aggeion (pronounced angeion), a vessel (diminutive of angos, jar); anthos, flower. One of our species, *A. burkittii*, has the odd common name Wires-and-wool, another, *A. tomentosus*, is Camel-grass, although it is a composite, not a grass.

Angophora. Gk angos, jar; phoros, bearing; alluding to the cup-like fruits or capless 'gum-nuts'. The incongruous common name 'Apple' still used in N.S.W. for these cousins of the eucalypts should be dropped.

Anguillaria. Named by R. Brown in 1810 after Luigi Anguillara (1512-1570), an Italian botanist who was professor of botany at Padua. (Omitted from Part 1, so included here.) *A. dioica* is Early Nancy or Harbinger-of-Spring.

Anisopogon. Gk anisos, unequal; pogon, beard. For the reason for the name, read Willis's description of *A. avenaceus* (Oat Spear-grass), Vol. 1, p. 180.

Anogramma. Gk ano-, prefix meaning up, upon; gramme, writing; i.e., above-writing, from the position of the sori on this fern.

***Anthemis.** Gk anthemis, flower (= anthos). The Greek name of the flower, khamaimelon, literally ground-apple, has given us the common name of **A. nobile*, Chamomile, which has an apple-like scent and has been much used medicinally. **A. cotula* is Stink-ing Mayweed.

Anthocercis. Gk anthos, flower; kerkis, a kind of poplar, and also perhaps the Judas Tree (*Cercis* sp.). Poplars are in the willow family, Salicaceae, whereas *Anthocercis* (Ray-flowers) are in Solanaceae.

***Anthoxanthum.** Gk anthos, flower; xanthos, yellow. **A. odoratum* is Sweet Vernal-grass, which when flowering in the mass would appear yellowish.

***Antirrhinum.** Gk anti-, like; rhis (genitive rhinos), nose or snout. In Gk the r was doubled when combining syllables. The meaning 'resembling a nose' is also implied in the common name Snapdragon, pinching the corolla sides forcing open the 'dragon's snout'. Our naturalized species is *A. orontium* (Lesser or Corn Snapdragon), present only in Wodonga district in Victoria, but also in several other States and New Zealand.

Aotus. Gk a-, not; ous (genitive otos), ear; because the bracteoles are lacking. Since botanical descriptions were (and still are) in Latin, generic names of Greek origin were put in a Latin dress, thus Aotos became Aotus, one of the many generic names doing duty also as a common name.

Apalochlamys. Gk apalos, soft, tender, weak; chlamys, cloak, mantle. *A. spectabilis* (Snowy Cassinia) was formerly *Cassinia spectabilis*.

Aphanes. Gk aphanes, invisible, inconspicuous (from phanos, light). Parsley Piert (**A. arvensis*), introduced from the north temperate zone, was formerly *Alchemilla*. Victoria has two native species of *Aphanes*. The 'invisible' tag was probably given because in some species the flowers are partly covered by leafy stipules.

Apelia. Gk apeles, literally without a stone, hence level, smooth, plain; transferred to people, it developed a metaphorical meaning 'simple', which has relevance re this generic name, alluding to the pistil with 1 carpel, 1 ovule and 1 style.

Apium. Latin apium, celery, parsley. (Some authorities derive apium from Celtic apon, water, others suggest a link with Latin apis, bee.) In addition to the introduced Celery* (*A. graveolens*), Victoria has two native species, Slender Celery and Sea Celery.

***Aponogeton.** From the Latin name of the healing springs at Aquae Aponi (now Bagni d'Abano), Italy; with Gk geiton, neighbour, added, on the analogy of *Potamogeton*, which means river neighbour. Originally applied to a water-plant found here (now *Zanichellia*), but transferred to the palaeotropical and South African genus to which our introduced species, **A. distachyus* (Cape Pondweed or Cape Water-hawthorn) belongs.

***Aptenia.** Gk apten, unfledged, un-winged; alluding to the absence of wings on the valves of the capsule of these plants formerly included in the genus *Mesembryanthemum*. **A. cordifolia* is Heart-leaf Ice-plant.

Arabidella. Schulz in 1924 transferred two species of *Blennodia* named by F. Mueller to a new genus, *Arabidella*, forming the name by adding the diminutive suffix -ella to *Arabis* (the

Rock Cress genus), substituting d for s for euphony. *Arabis* is a Latin genitive, meaning from Arabia.

***Araujia.** This South American genus was named by Brotero in 1818 from the Brazilian vernacular name (there is an estancia named Araujo in Argentina). Our introduced species, *A. hortorum*, White Bladder-flower, is the weed known sometimes as Cruel Plant, probably from its capture of native moths and bees and their imprisonment until death in the way described by Ewart in 'Flora of Victoria', page 954.

***Arbutus.** Lat *arbutus*, the name used by Virgil for the Strawberry Tree, *A. unedo*, derived from Celtic ar boise, rough bush, because of the granular fruit. The Roman naturalist Pliny derived *unedo* from Lat *unus*, one, and *edo*, to eat, i.e. to eat one only, because of the gastronomic effects! This Mediterranean species has an isolated distribution in the British Isles, being native there only in Ireland, while in Victoria it is naturalized only in the J grid (at Creswick). *Arbutus*, like *clematis*, should be accented on the first syllable, but in both cases the common pronunciation on the second syllable is too widespread to be replaced by the more correct form.

***Arctium.** Gk *arktion*, name of a plant, perhaps a mullein, also called *arcturus* by Pliny (from Gk *arktos*, a bear; *oura*, tail). **A. lappa*, our introduced species, Burdock, derives its specific name from Lat *lappa*, a bur.

***Arctotheca.** Gk *theke*, a box, became Lat *theca*, hence a seed-box. South African botanist Levyns in 1942 transferred *Cryptostemma* to this genus (founded by Wendland in 1798). *C. calendulacea*, Capeweed, originally named *Arctotis calendula* by Linnaeus in 1753, became *Arctotheca calendula*. *Arctotis* is from Gk *arktos*, bear; *otos*, ear, hence the common name of our other introduced species, **Arctotheca prostrata* (syn. *Arctotis*), Creeping Bear's-ear. Our native Australia Bear's-ear, *Cymbonotus lawsonianus*, was described as *Arctotis australiensis*. The scales of the pappus are said to look like the ears of a bear.

***Arctotis.** See previous entry. **A. stoechadifolia*, White Arctotis, was named in 1767 when *Stoechas* (from Gk *stoikhos*, a row), now included in *Helichrysum*, was still a valid name, the specific name meaning 'with leaves like *Stoechas*'.

***Arenaria.** Lat *arena*, sand, most of the species preferring sandy places. The common name, Sandwort, is also in allusion to this. (Common names ending in -wort are often mispronounced as though this syllable is spelt wart, which is an excrescence on the skin; wort, pronounced as though spelt wurt (like word, work, worth, etc.) is an old English word for plant, spelt wyrt in Anglo-Saxon, and cognate with German Wurz, root. It is odd that our word root, Lat *radix* and Gk *rhiza* are virtually the same word as this word wort.)

To be continued.

Sunday, 1 September, to Sunday, 8 September.—Kangaroo Island. This excursion will start from Adelaide and includes Motel accommodation on the Island, air travel between Adelaide and Kangaroo Island, and day excursions at the cost of approximately \$135. Starting from Adelaide will enable members to spend extra time in S.A. if desired but a group booking can be arranged on the train if members wish to travel on the same day. Bookings for this excursion were already made when we discovered the National Parks Association considering a trip to Kangaroo Island also, but we felt both excursions could be successful as the dates differ and the size of the N.P.A. party is strictly limited.

A \$25.00 deposit should be paid to the Excursion Secretary when booking.

Notes on Peregrine Falcons at Anglesea

by SIMON E. TOWNSEND

During a combined geography and biology camp to Anglesea, Victoria with my late school in October of 1973, I was fortunate enough to make a few short notes and observations on nesting Peregrine Falcons (*Falco peregrinus*). I now feel I can safely write a little about them, since if they raised the resultant eyeases with success, they will have long since flown from the nest; safe from itinerant egg collectors and budding falconers.

On 9 October, 1973 at 7.30 p.m., whilst fossicking on the beach directly below the sandstone(?) cliffs, behind "Burnside" (on Bass Strait, and one mile north-east of the mouth of the Anglesea River), I saw a Peregrine Falcon glide over the cliff top and out of sight. I left the beach and ascended the cliff by a path, hoping to catch another view of the bird, but with no result. That evening, I met a companion (a keen hawk man) who told me he had found a peregrine's nest, and asked would I like to see it. I would and I did.

Next morning the nest was revealed. It lay half way down or 100 feet up the sheer cliff below which I had been the day before. The nest itself was on a ledge about four feet long and a little over a foot wide, in which there was a depression containing eggs and an incubating female peregrine. She was not greatly disturbed by our presence, and occasionally looked up at us, cocking her head on one side and holding us wrapt with a single eyed stare. She lost interest in us fairly rapidly and pressed lower into her nest to avoid the strong sea blast which visibly disturbed her. My com-

panion and I retired to a discreet distance to the less "heady" vicinity of the cliff-top heath, and awaited the return of our peregrine's mate.

We allowed 15 minutes for his return, and when he did come back he did so unheralded; for he made no call or conspicuous flight above the cliff top, but was sitting on the edge of the ledge beside his mate, apparently staring at the cliff. We ventured to look over the edge again. We should not have done this so suddenly for he looked up instinctively and was put to flight by the sight of us, and he was instantaneously followed by his much larger mate. Fortunately they both returned, screaming and chittering and swooping towards us intent on driving us away. We gladly left, hoping she might cover the eggs again before they became cold, which she did.

I had never suspected that the differences in the sizes of the sexes of this species would have been so great, yet the larger bird was clearly twice the bulk of the smaller, and a tail-length longer as well. (Text books carry average sizes yet they mean very little until live comparisons are experienced.)

The eggs were three in number, one rather smaller and rounder than the others, but all a beautiful golden brown mottled with darker tints and hues. They rested in a slight depression on the bare rock of the ledge. In themselves they resembled three water-worn pebbles.

Having disturbed the birds considerably already, we ventured to the base of the cliff to search for castings

and tirings (playthings which a hawk pecks at), of which one of the former found was made up of the feathers and bones of a Crimson Rosella (*Platycercus elegans*). Of the latter, some mammal bones, presumably rabbit, as well as the end of a rosella wing, were found. These were amidst a lot of other litter, mainly mutes or droppings; yet were discernable due to wedge-shaped pieces cut out of them corresponding to the peregrines beak. Some of the bones had so many wedges taken out of them, that it was clear they had been retained and utilized long since their association with any food.

Next day my companion procured another casting we had overlooked. It was quite old and weathered, but was clearly composed of Silver-eye (*Zosterops lateralis*) feathers, and contained within it a piece of quartz a cubic centimetre in size.

We did not see the male kill (since the female appeared only to incubate) or return with any prey, nor did we find any fresh castings or fresh litter, which was most unfortunate, since I was eager to see whether any shore birds were included in their diet.

At the base of the cliff however, there was much to keep me occupied apart from the peregrines. Beside the remains of numerous decomposing cuttle-fish I found the remains of a number of Fairy Penguins washed

high up on to the beach above the high tide mark, and left to dry in the sun after being dashed to death or drowned by some previous violent and stormy sea. Most interesting and unusual of all were the remains of two Black-tailed Wallabies.

I collected the skull and skeleton of one at the base of the cliff. It may be reasonable to conclude that both animals had gone over the cliff at night, or after having been chased by local dogs. The heath and bush above contains a large number of this species (*Wallabia bicolor*).

On 12 October, the day before my departure, I decided to risk disturbing the nesting peregrines for the last time, and photograph the incubating female. I photographed her with little difficulty, but unfortunately any vestige of technique on my part was to totally absent, that the result was unrecognizable, as well as being useless for reproduction.

In this country we seldom realize how fortunate we are to still have resident populations of species so vulnerable to human activity as Peregrine Falcons; not only occurring but breeding within easy reach of a town and two major cities. This is a species which is believed to no longer breed anywhere along the entire east coast of North America, where once it was common. We are fortunate indeed!

JUNIOR F.N.C. MEETINGS

Friday, 22 February — Hawthorn meeting in Town Hall at 8 p.m.

Friday, 1 March — Preston meeting at 281 High St., Preston (Rechabite Hall) at 8.00 p.m.

Friday, 8 March — Montmorency and District in Scout Hall, Petrie Park, at 8 p.m.

Friday, 8 March — Black Rock meeting at 8 p.m. in Congregational Church Hall, cnr. Arkaringa Cres. and Bent Parade.

Nature Notes from the Gold Coast

by ALEX. N. BURNS.

August

Until two days ago, when almost 2 inches of rain fell, the weather for the past month had been fine and dry producing conditions at the big lagoon at the Currumbin Sanctuary for the return of many of the water birds. The wild duck population again stands at about four hundred; the Ibises too have greatly increased in number, and at present are having a great time coping with the nymphal short-horned grasshoppers (Orthoptera-Acridiidae) which are present in very large numbers on the grassy flats bordering the lagoon. The black swans have again produced cygnets; five eggs were laid but three only hatched and one of these perished. The male swan, notorious for his liking to attack any human being that came within almost sight of his domain, has for some unaccountable reason become quite docile, in fact, almost friendly! Throughout the sitting and rearing of three lots of cygnets the little wood duck has been a close and constant companion of the black swans; this friendship has persisted now for just over three years.

During the past month the prevalence of Hawk Moth larvae (Lepidoptera-Heterocera-Sphingidae) on some garden shrubs and many native ones has been a matter of daily observation. One large Gardenia bush in the garden was almost defoliated by larvae of one of the day flying Bee Hawk Moths of which three species are recorded for northern Australia. The species in question is probably *Cephonodes kingi* (Macl.). The Bee Hawks have transparent wings and the body covered

with greenish yellow scales; the males have brush tails which can be extended like an open fan. A fully grown hawk moth larva was collected from a young Madagascar Tulip tree in a garden; this specimen was taken home for breeding out, and in due course it produced a fine specimen of the Oleander Hawk Moth. This may prove to be a new foodplant record for this species.

In a Paper bark tree swamp (*Melaleuca leucadendron*) near the Currumbin Sanctuary, specimens of the Eastern Brown Crow butterfly [*Euploea tulliolus tulliolus* (Fab.)] have been unusually plentiful, and in fact are still so. The larval foodplant (*Marsdenia* sp.) is very plentiful in the area, and each late summer and autumn one can get specimens commonly; but this season has been outstanding in the number of these butterflies. One small shrub in shade in this spot had no less than 46 specimens settled on the twigs. These could be approached so easily that it was possible to pick up odd specimens in the fingers. Other shrubs nearby had similar numbers resting on them.

Another interesting butterfly record comes from the home garden where an Egyptian Paper tree has just come into flower. This has attracted bees, small Diptera and Hymenoptera in vast numbers, and at 9 a.m. this morning no less than 14 different species of butterflies were on the flowers at one time. These were represented by five species of Nymphalidae, three Danainae, three Pieridae, three Lycaenidae, and one Hesperid. Although at times butterflies are plentiful in the

garden it is unusual to see so many species on one inflorescence at the one time.

The colder nights and evenings are bringing the Scrub Turkeys in the national park closer, and in greater numbers to be fed in the late afternoons. It is not unusual to have 24 of these accompanied by up to 6 or 7 Rock Wallabies. The turkeys seem to score best with the stale sliced bread thrown to them; a timid wallaby will, by careful manoeuvring, secure a slice, but often whilst holding it in its fore-feet a turkey will rudely snatch it away. The wallabies do not appear to retaliate in any way, and it is in fact sometimes quite a job to ensure that they get a meal.

In the National Park and other rain forest areas the large *Nephila* spiders are unusually plentiful; in fact when walking through the bush or even along narrow tracks, one must carry a stick to clear away the strong and sticky webs. These large greyish spiders with yellow at the joints of the legs construct webs strong enough to hold a man's hat. In one distance of three chains no less than a dozen webs had to be broken in order to be able to proceed without considerable discomfort.

September

The white "butterfly eating" spiders are again active; the first victim being a Noctuid moth belonging to the genus *Plusia*, and was captured by a spider lurking in the rosette-like inflorescence of the pretty Pentas bush. This specimen was kept under daily observation, and two days later, much to the writer's surprise, a female Richmond Birdwing (*Ornithoptera priamus richmondii* Gray.) was dead on a head of flowers, another victim to the same spider. A female Richmond Birdwing is a large big bodied butterfly and

was initially handicapped by its legs becoming enmeshed amongst sticky threads spun amongst the small individual flowers. The spider acted with great speed in grabbing portion of the butterfly's thorax between the legs, and biting. The spider's venom acted almost immediately, and within a couple of minutes the unfortunate butterfly was capable of only very weak movements, and in less than five minutes was quite paralysed and helpless. The butterfly was taken and set and will be labelled accordingly. Next day a male Common Jezabel butterfly (*Delias nigrina* Fab.) was captured and eaten; two days later a Common Pearl White (*Elodina egnatia angulipennis* Luc.) became the next victim. Several days elapsed before another butterfly was captured; this being a skipper, the Common Greenish Darter (*Telicota ancilla ancilla* H.Sch.), and not being a large insect, was soon disposed of. The last week has produced showers (some heavy), at night, and these seem to have slowed down the activities of the spider. It is still in almost the same position on the Pentas bush and is being kept under daily observation.

Each month since last June, Richmond Birdwing butterflies have appeared in the garden, which is probably because we had a mild winter and a good deal of rain which has kept feeding plants healthy and green. This caused several species of butterflies to appear which normally do not appear on the wing until September, so the prospects for a good summer season are encouraging. Since last evening and during today almost four inches of rain have fallen; this will, even if no more falls for two or three weeks, keep food plants growing, and also make conditions right for the hatching of *Lepidopterous* pupae.

Notes on the Aborigines of the Wonthaggi District

Based upon early records

by ALDO MASSOLA.*

The group name of the Aborigines who owned the country between the Bass and the Tarwin rivers was not recorded, but being the most southerly group of the Bunurong tribe its members are here called "Southern Bunurong". Their neighbours to the south-east, across the Tarwin River, were the Jatowarawara group of the Bra-taoulung, and those to the north-east, over the ranges, were the Braiakaulung, both of these being clans of the Kurnai of Gippsland. To the north and north-west of the Southern Bunurong, across the Bass River, lived the Bonkoolawol, who, like themselves, were a group or section of the Bunurong who, collectively, owned the country around Western Port and Port Phillip as far as the Werribee River. The Bunurong and the Kurnai were traditional enemies.

Almost nothing is known of the Southern Bunurong, but they survived the Bonkoolawol, who, according to a report by William Thomas, the Assistant Protector of Aborigines, became extinct in 1840.¹ The reason for their extinction was not stated, but it can be safely put down to two causes, the first of which was the sealers who raided the coastal camps killing the men and carrying off the women; and no doubt introduced European diseases against which the natives had no remedies.

Evidence of sealers was found on Seal Island, in Western Port, by John Murray on 18 December 1801, when on his voyage of exploration; and when the *Corinella* expedition entered the Western Passage on 24 November

1826 they saw sealers on Phillip Island. They had lived there for several years and kept native women. It is believed that sealers sporadically visited Western Port as late as 1844.

The second likely cause for the Bonkoolawol's extinction was that being thus weakened both physically and numerically, they fell easy victims to their ferocious enemies, the Kurnai of Gippsland, who, at about that period, were continually raiding the Bunurong camps, their war parties reaching as far as Brighton.²

It was different with the Southern Bunurong. Although they also must have suffered sealer's raids they were, according to A. W. Howitt,³ on friendly terms with the Jatowarawara Kurnai across the Tarwin River, and even intermarried with them. The reason for this anomaly was not given, but Howitt was a careful recorder, and his statement must be accepted as correct.

Their country, moreover, was protected, at least from potential Aboriginal enemies, by a Being called Lo-an and by the superstitious belief that unless proper precautions were taken by those who entered it for the first time, even if on a friendly visit, they would be attacked by the mysterious powers guarding it.⁴ G. H. Haydon, a member of the expedition which, in 1844, was successful in discovering a practical cattle route between Melbourne and Gippsland, recorded⁵ the strange behaviour of the six Native Police (most likely Bunurong), who were with the party, though he did

* 4/18 Wolseley St., Mont Albert, V. 3127.

not realise the significance of their actions. He stated:

"I noticed during the whole of the journey, when they camped in the evening they invariably cut a number of boughs and twigs, and made a kind of leafy throne, on which they reposed. As I had never seen this done in their own district, I enquired the reason, but all the information I could gather was, that it was a custom with them to do this when they visited a tract of country for the first time. One or two of them had been here before, but I noticed they usually went through the same ceremony, which they call 'annert'."

Regarding the nature of the country, he stated:

"It was a most difficult matter to get through it even on foot. It was like forcing a way through a quick set edge, with the addition of large saplings and full-grown trees springing up in every direction."

Despite the passing of the years the country remains one of the most difficult in Victoria in which to seek for Aboriginal relics. The terrain is hilly, intersected with high-banked creeks, the coastal plains either pastures on which traces of the Aborigines have been obliterated, or else swamps or mud flats covered with heath and scrub and almost impassable tea-tree belts.

Haydon's party met no Aborigines, but indications of their presence were found:

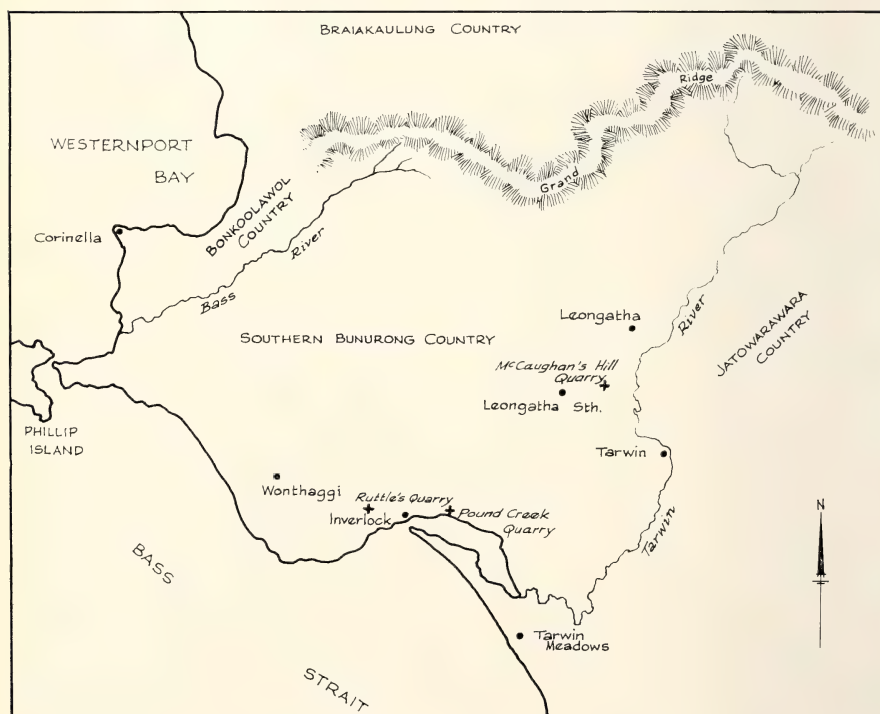


Figure 1

"... Many of the trees near the river (the Tarwin) had been stripped to the height of twenty feet by the Gipps Land blacks for the purpose of making canoes."

And upon crossing and proceeding up the river:

"... We suddenly came upon a deserted camp of the aborigines; it contained upwards of a hundred huts; observing this, the blacks who were with me (i.e. the Native Police) worked themselves into violent passions and commenced throwing their tomahawks and knocking down the huts in every direction. They said, this had been a camping ground of the Gipps Land natives, who were their enemies."

This could hardly have been a war party's camp, since no huts were erected by raiding parties. It was most likely a Jatowarawara camp, and by calling them their enemies it shows that whatever relations were maintained with them by the Southern Bunurong, they were no friends of those from the north.

This camp on the Tarwin, which has since been located, and one small campsite on the Bass River close to Poowong,⁶ are the only inland ones known to me. On the other hand there are middens dotting the shore line, especially where there are rocks at sea from which shellfish can be obtained, from the south side of Powlett River, through Williamson's Beach, Harmer's Haven, Cape Patterson, Honeysuckle Hill and Eagles Nest to about opposite Petrel Rock in Venus Bay, and on the south-west side of Anderson's Inlet.⁷

It is obvious that the Southern Bunurong much preferred to camp on the coastal sand dunes and on the more open stretches of country immediately behind these; and it is possible that the inland camps were only

used during the periodical walkabout or as places of refuge when hard-pressed by their enemies. Reminiscences of early settlers do not help on this point, though they are sometimes of great assistance otherwise.

The first European to settle in the district was Samuel Anderson, who arrived at the Bass River only a few weeks after Batman and Fawcner had entered Port Phillip. By 1842 he was joined by his two brothers, and it was they who dismantled the brick huts at the Corinella Settlement, this in order to obtain material to build their own homestead on the banks of the Bass (or *Weandon*, as it was known to the natives).

All that was left of the Corinella Settlement in 1844, when Haydon visited it, was the remains of about fifty houses and huts in the shape of brick foundations and sawn timber; the stump of the flag staff; and the remains of a dam which had been constructed across the creek both in order to stop the salt water mingling with the fresh and to conserve the latter.

The Anderson brothers encountered wild cattle on the Powlett Plains and especially at the Clump Spring (which is now the town of Wonthaggi). This at first puzzled them, but later they learned that they were the progeny of the cattle left behind by the Corinella Force. No doubt the Aborigines had hunted the cattle across the Bass and Powlett Rivers, and they had found refuge in the more open and therefore safer plains country.

It seems that the Aborigines gave little trouble to the Anderson brothers, although Hugh Anderson's hut was once raided during his absence and stripped of its contents. Later, however, a lubra took him to the spot where the articles had been "planted" and he was able to retrieve everything with the exception of three or four

red shirts, which must have taken the Aborigines' fancy and were nowhere to be seen.⁸

South of the Tarwin the country was first taken up by George Raff in, or about, 1842. He sold to Edward Hobson, and he to George Black in 1851. Black gradually extended his run northwards to the Clump Spring (Wonthaggi) and on the south to the head and west side of Waratah Bay, taking in Cape Patterson, Anderson's Inlet and Cape Liptrap. He had a daughter, Maud, who was born at Tarwin Meadows in 1872, too late to remember the Aborigines; but she was historically minded, and kept a diary in which she entered all she could find out about olden times. Her younger brother, Murray, who lived to be a very old man, made use of her diary when preparing a lecture on the settlement of the district which he delivered to the Wonthaggi Historical Society in or about 1960.

Mr. Murray Black was very interested in the Aborigines, and made extensive collections of stone implements, which he donated to the Institute of Anatomy in Canberra, and of skeletal material which is now in the Anatomy Department of the University of Melbourne. Most of this material, however, is from the Darling River region of New South Wales, and does not throw any light on the Southern Bunurong.

His notes on the Aborigines for the Wonthaggi lecture, on the other hand, help us to understand some obscure points.⁹

He stated that:

"The Tarwin Aborigines were very numerous at some time judging by the extensive camping sites at Cape Liptrap to Anderson Inlet. The north Gippsland blacks — or Omeo — made a raid through Gippsland shortly before the white man ar-

rived. They killed several near the Meadows Homestead but could not have practically exterminated the tribe, who were forced to live in small family groups in order to hunt game. There were only six aborigines at Tarwin in 1851 when George Black arrived and they said their enemies killed some of them. It is more likely that the Phillip Island aborigines caught measles or some disease from the Sealers and Whalers from Tasmania and would desert their camps to escape the hoodoo, thus spreading the disease everywhere they went . . .

. . . The Tarwin aborigines were the tomahawk makers for surrounding tribes and were all friendly through a periodic barter. They secured a red flinty stone from Mornington Peninsula for instance, and would exchange axe heads and flint implements which were made at Tarwin.

The principal diorite quarries were about a mile north-west of Inverloch, Ruttle's Quarry and near Pound Creek and McCaughan's Hill. The flint was secured along the Ocean Beach, washed up attached to the roots of kelp and seaweed. The raiding party of 1840 evidently took a number of axes on their return journey, but got tired of carrying them when they reached Sandy Point as 70 axes were found there in one heap about four or five years ago, in 1955."

This is interesting material. However, the six "Tarwin" Aborigines could have come from either side, or both sides of the river, since, by 1851, the tribal organisation had broken down. They could therefore have been either Southern Bunurong or Jatowarawara; and they did not necessarily have to be the entire remaining Aboriginal population of the district. Some could have gravitated

towards the earlier Anderson settlement on Bass River, and it is known that at least two Aborigines were employed by the McHaffie brothers on Phillip Island as late as 1870.

Then, although the "Omeo" Aborigines were the traditional enemies of the Kurnai of Gippsland, the Tarwin River is a long way from Omeo, and it is most unlikely that they travelled all that distance through such a country to raid a Kurnai camp when there were dozens much nearer home. It is more likely that the attackers of the Tarwin Meadows group were Bunurong. According to Samuel Rawson¹⁰ who had settled at Yallock station, a party of Aborigines arrived at his station from Narre Narre Warren in February, 1840; and leaving the old men, women and children at the station went off "to avenge the death of their companions". They returned to Yallock on 9 March "bringing immense quantities of human flesh with them".

Further, if the "70 axes" were indeed dumped by an attacking party, then it must have been Bunurong and not "Omeo" since Sandy Point is on the old track to Narre Narre Warren.

It is also as well to state that in February, 1967, when I was investigating the feasibility of Red Bluff and the Stockyard (Sandy Point) being the starting off point for the Bunurong's seasonal excursions to French Island for collecting swan eggs, I was shown around the locality by a local land owner, Councillor G. Ridgway. I have on record in my diary that he told me that there was an Aboriginal campsite by a permanent waterhole about 500 yards inland from Red Bluff; and that the waterhole was scooped out to make a dam, and in the process "a number of axes and other Aboriginal stones were recovered, which made quite a little heap".

These implements could have been lost over the years by the natives camping there, and the "little heap" could easily have become the "70 axes" reported to, and subsequently by, Black.

Black's reference to the stone quarries, however, is of real value since it supplies the reason for the friendship stated by Howitt to have existed between the Southern Bunurong and the Jatowarawara Kurnai. Stone axes were most important in Aboriginal economy, and any group having a quarry in its territory would be friendly with all its neighbours; nor could they be dispossessed of it by force, since the aggressors would lack the necessary "magic" for working the quarry and the stone would not make good axes.

These quarries, by analogy with still existing ones elsewhere in Victoria, were probably outcrops of diorite from which the natives detached suitable "blanks" and traded them in the blank state. The quarries' existence is undoubted because in recent years they were found by quarriers and worked for road metal; and all traces of native industry obliterated in the process. It would be a futile exercise to describe them as they are now; but their position is here recorded.¹¹

Summary

The Southern Bunurong owned three diorite quarries, and this assured their safety as a group living on a hostile border. The trade in axes promoted amicable relations between the traditional enemies to the point that intermarriage was taking place.

LITERATURE CITED AND ACKNOWLEDGEMENTS

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6. I am indebted to Mr. W. R. Hartnell, of Morwell, for information regarding this campsite.
7. I wish to record my thanks to Mrs. Susan Kirk, of Wonthaggi, for taking me to these middens which she knows so well.
8. Peck, H. H.—*Memoirs of a Stockman*. Melbourne, 4th printing, 1972.
9. Black, G. M.—*George Black and the early settlement of Tarwin Meadows; from the Records by Maud Black*. Typescript (1960).
10. Rawson, S.—*Journal from November 1839 while forming a New Station at Western Port on the Southern Coast of New Holland*. Ms. in National Library of Australia.
11. I am indebted to Mr. J. Webb, mining engineer, of Wonthaggi, for showing me the locality of these quarries.

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Field Naturalists Club of Victoria

Hawthorn Junior F.N.C.

Annual Report, 1973

Key Office-Bearers 1 January, 1974

President — Michael Coulthard.

Treasurer — Wendy Clark.

Secretary — Robin Sandell.

Editor — Alan Burns.

Perhaps the most outstanding feature of 1973 was that the Club's organisation, for the first time in ten years, was quite independent of Barry Cooper, a person who largely shaped it up until his departure from Australia in 1972. Despite this, the Junior Council rallied together and, particularly through the outstanding work of Mike Coulthard as President, provided a varied array of activities for Club Members.

The stability of Council was shown in part by the very small number of changes in Office-Bearers during the year. Elizabeth Fearon resigned as Assistant Treasurer, and was replaced by Chris Howes and Ulla Schulz took on Caroline Durré's former office of Excursion Secretary.

Meetings:

Unfortunately, the October Meeting was cancelled because of a Power Strike. Meetings over the past year were:

2 February — Members' Night.

23 February — "Through the Kimberleys", by Mr. A. Morrison.

30 March — "The Bushfly and Biting Flies Found in the Bush", by Mr. Wilson.

27 April — "Kangaroos", by Mr. M. Yardy.

25 May — "The Ecological Effects of Introduced Pest Animals and Plants", by Mr. G. Douglas.

29 June — "A Practical Demonstration of the Collection of Pondlife", by Mr. D. McInnes.

27 July — Three nature films.

31 August — 30th Birthday and Members' Night.

28 September — "Wildflowers and Native Plants", by Mr. B. Fuhrer.

30 November — "Beetles", by Mr. P. Kelly.

It is hoped that more meetings of the demonstration type will be held in 1974.

Excursions:

An innovation in 1973 was a combined day and overnight excursion to the Lorne area in September. Although not very well attended, those who did

go found the week-end a rewarding one. Excursions held during the year:

11 February — Bushranger Bay — walking trip.

2 March — East Kew — mammal spotlighting.

31 March — Toolangi — invertebrates.

26 May — Keith Turnbull Research Station.

7 July — Alexandra Gardens — pondlife.

5 August — Powelltown — General.

28-29 September — Lorne area — Wildflowers.

6 November — Werribee Gorge — F.N.C.V. President's Picnic.

2 December — East Warburton — Beetles.

Easter Camp:

The 1973 Camp was held at Red Cliffs and the Boundary Bend area in N.W. Victoria. A bus was hired and about 60 members attended. The Club was fortunate in having the assistance of members of the Sunraysia F.N.R.T. and the Mid-Murray F.N.T. to arrange campsites and to act as guides during the day. Three nights were spent at Red Cliffs and two at Boundary Bend. A detailed report of the trip was published in "The Junior Naturalist".

A special meeting was arranged on 9 June for the showing of photographs and slides taken on the Camp. This was attended by 70 people.

Publications:

Michael Howes filled the vacant position of Assistant Editor in August. New inclusions in "The Junior Naturalist" during the year were a "Look" column and a back page "Conservation Thought". A three-page report on the Club activities of the previous twelve months was published in the August issue.

The Club printed a booklet called "How Too . . .", by Rosalind St. Clair, which was completely sold out at the Nature Show.

The Club organised an exhibit at the S.G.A.P.'s Australian Plants and Nature Exhibition in September. The theme of the exhibit was "There's More in the Bush than you Think" and consisted of a typical scene from both a wet and dry area with specimens of animals likely to be found in each.

Conservation Sub-Committee:

A Sub-Committee was formed in August to establish a conservation policy for the Club. In its three meetings in 1973, the education of members in conservation and matters arising from other conservation bodies were discussed.

* * * *

F.N.C.V. General Meetings

10 December

The final Club meeting for the year was well attended. Mr. Jim Willis gave a most interesting and informative talk on Eucalypts, the full text of which will be published later in the "Naturalist".

A large number of exhibits were on display including Foraminifera collected in Carnarvon, W.A., and shown under a club microscope; an Aboriginal grinding stone from Raymond Island in the Gippsland Lakes; pressed plants and a spider for identification; and some garden grown native plants. A member also reported having observed ravens feeding on locusts in a Melbourne suburb.

The usual lists of Club correspondence, minutes of Council meeting and general notices were on display. The Secretary read a letter from Sale Field Naturalists' Club appealing for speakers who would be willing to address their Club. Christmas cards were received from Miss Jean Galbraith and from Mr. and Mrs. Hudson, now living in England. Mr. McInnes reminded members that Mr. Hudson had at one time been Editor of "The Naturalist".

The President announced that the Herbarium would no longer be able to accommodate the Club's Library, as they needed the room for their own use, and, although Council was investigating alternatives, it seemed likely to be some time before the library would be available again. Mr. Kelly said that the Conservation Council of Victoria expected to receive a grant to assist in the establishment of a State Conservation Centre and F.N.C.V. Council intended to co-operate in the planning of the centre.

A brief report of the work of the Club Improvement Committee was given, and the new publicity leaflet which they have prepared was on display and available for distribution.

Subscriptions:

Due to increased postal charges, the Club was forced to raise subscription fees. In early 1974, family membership rates will be introduced. Present rates are—

Junior Members—\$1.00 per annum.

Adult Members—\$2.00 per annum.

Miss Gwen Piper spoke briefly about proposals to subdivide Green's "Main Ridge" estate at Dromana, and suggested that members interested might sign two petitions which she had prepared appealing against the subdivision and urging the preservation of the area in its natural state.

14 January

After opening the meeting and welcoming members and visitors the President announced the death of Mr. F. P. (Frank) Morris. Mr. Ros Garnet spoke briefly about Mr. Morris's career as a botanist at the National Herbarium and his membership of the Club which he joined in 1918. He was President in 1942/3 and was elected an honorary member in 1961. Mr. Garnet also said that shortly before his death Mr. Morris had made a gift of \$300 to the Club.

As usual at the first meeting of the year the programme was a Members' Night; the organiser, Mr. Ian Cameron, presented an interesting and varied selection by club speakers.

Mrs. North spoke about growing coffee in New Guinea, illustrated with a few well-chosen slides. Mr. North showed a few slides of New Guinea flowers which they had seen on their recent trip.

Mr. Ian Morrison showed a series of slides illustrating the life history of a saw-fly; Mr. Alan Morrison showed the life history of the Wanderer and Caper-white butterflies; Mrs. Bennett gave a report of the Club excursion to Werribee Gorge and showed a few slides of this and other Club outings; Mrs. Bishop spoke about the life history of the sea urchin and Mr. Tom Sault described and showed slides of the Green's Bush area on Mornington Peninsula.

Exhibits at the meeting included pressed ferns from the Lower Glenelg area, a small piece of fossil bone from

a beach near Portland, and the skull of a Short-nosed Bandicoot collected in the Grampians. The teeth and portion of the shell of the sea urchin were shown under the microscopes.

A full list of correspondence was displayed at the back of the hall; the Secretary referred to two letters requesting club assistance in conservation matters. The first was a request from the Rotary Club of Seymour asking for support for a proposed park in the Tallarook forest area and for assistance in assessing the area. The second letter requested help in opposing a proposed subdivision of an area adjacent to the Little Desert and bordering on the Wimmera River. A copy was also received of the Westernport Regional Planning Authority's decision to disallow the subdivision of the Green's Bush area.

During general business attention was drawn to a press report which stated that the government intended to terminate the Tatra lease in Buffalo National Park. It was agreed that the Minister of Conservation should be congratulated on this decision for which conservationists had been pleading for many years.

Speaker at the February meeting will be Mr. Dan McInnes whose subject will be "Between High Tide and Low Tide".

Field Survey Group

August

The topic for the August meeting of the Field Survey Group was "The Fern Gully Environment". The speaker, Mr. Tom Sault gave an interesting, well-illustrated talk on the typical fern gullies to be found, with particular emphasis on the geology and botany of these areas. A large number of specimens to be found in areas near Melbourne were on display, and were of great interest to the eighteen members and friends who attended. The evening closed, as usual, with coffee.

September

As the September meeting coincided with Show Day, the group met in the Monash Medical Centre because of the Conference Room being unavailable.

Despite the last-minute change in venue, eighteen members and friends attended to hear F.N.C.V. President, Mr. Peter Kelly, speak on "Beetles". The address was of great interest to members, as Mr. Kelly gave some insight into the work he had done with one particular group of beetles, the Chrysomelids. He rounded off an extremely well-illustrated lecture with a number of slides of Chrytozoic Beetles such as are usually found under logs. The evening closed, as usual, with coffee.

Botany Group Meeting — 13 December

The final Botany Group meeting for the year was well attended. Mr. Leon Costermans spoke on "Australian Plants in their Natural Environment", and showed a series of slides demonstrating the effect of geological formations and climatic conditions on the vegetation. He also spent some time discussing the layout and contents of his forthcoming book on the flora of south-eastern Australia.

A report of the group outing to Starling's Gap was given and some pressed plants collected on the trip were displayed with a list for the immediate area of the gap. Exhibits included plant specimens from Lake Mountain and also the Bog-rush (*Schoenus turbinatus*) collected near Anglesea, the location of its first discovery in Victoria in 1961. It occurs also in the Grampians and in New South Wales and Tasmania.

An election of new group office-bearers for 1974 was not necessary, as President, Mr. Ian Cameron and Secretary, Mrs. Margaret Corrick accepted nomination for a second term. The usual Christmas supper followed the meeting.

The February meeting will be a Members' Night. A programme of outings for 1974 will be drawn up by the excursion committee who would welcome suggestions. It is anticipated that the collection of material for pressing and display at subsequent meetings will continue as a means of helping beginners. It is suggested that anyone wishing to study or learn about a particular group of plants should contact Botany Group, as we are anxious that our outings and meetings should provide opportunities for learning and sharing of knowledge.

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Baptist Church Hall, Highbury Gve.

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Lower Town Hall, Ovens St.

SHEPPARTON—Saturday, 16th March,
St. Augustine's Hall, Orr St.

RINGWOOD—Monday, 18th March.

MELBOURNE—Tuesday, 19th March,
Theatrette, A.M.P. Building, corner
Bourke and William Sts.

BEAUMARIS—Wednesday, 20th March,
Black Rock Civic Hall, corner Bal-
combe Rd. and College Gve.

BENDIGO—Thursday, 21st March, In-
stitute Technology, McCrae St.

MONTMORENCY—Friday, 22nd
March, West Riding Community Hall,
Petrie Park, Mountain View Rd.

MARYBOROUGH—Saturday, 23rd
March, R.S.L. Hall, High St.

BALLARAT—Monday, 25th March,
Assembly Hall, Sebastopol Technical
School.

CLAYTON—Tuesday, 26th March,
Theatre R 1, Rotunda, Monash Uni-
versity.

GEELONG—Wednesday, 27th March,
McPhillimy Hall, Latrobe Tce.

MALVERN—Thursday, 28th March,
Banquet Hall, Malvern City Hall.

BLACKBURN—Friday, 29th March,
The Avenue Church Hall.

FERNY CREEK—Saturday, 30th
March, Ferny Creek Horticultural
Society Hall, Hilton Rd.

FLEMINGTON—Monday, 1st April,
St. Brendan's Hall, corner Church and
High St.

CROYDON—Tuesday, 2nd April,
Croydon Hall, Mt. Dandenong Rd.

HEIDELBERG—Wednesday, 3rd April,
Scots Church Hall, Burgundy St.

HAMILTON—Thursday, 4th April,
Hamilton Town Hall.

SWAN HILL—Friday, 5th April,
Methodist Hall, Beveridge St.

MILDURA—Sunday, 7th April, Arts
Centre Theatre.

Needed Urgently

The Editor is in need of smaller articles to help in making up the normal content of the *Victorian Naturalist*. Surely something of interest is seen on the many excursions undertaken by members.



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Entomology and Marine Biology: Mr. J. W. H. STRONG, Flat 11, "Palm Court", 1160 Dandenong Rd., Murrumbeena 3163 (56 2271).

Field Survey: Miss L. BARRACLOUGH, 4-7 Chrystobel, Cres., Hawthorn, 3122

Geology: Mr. T. SAULT.

Mammal Survey: Mr. D. KELLY, c/o 14 Finnigan's Road, Research, 3095.

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Rates of Subscriptions for 1973.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Wednesday, 13 March — At National Herbarium, The Domain, South Yarra, commencing at 8 p.m.

Subject for Evening — Annual Meeting and Presidential Address.

New Members —

Ordinary:

Miss S. Anderson, 182 Beaconsfield Pde., Middle Park, 3206.
Mrs. Rose E. Bernadou, 81 Park St., South Yarra, 3141.
Miss Coralie Binmore, 61 McCracken St., Essendon, 3040.
Mr. Peter Carwadine, 2A Victoria Rd., Malvern, 3144 (*Entomology and Botany*).
Mrs. Robin Collins, 6 Lempiere Ave., Balaclava, 3183 (*Mammal Survey and Botany*).
Miss Suzanne Griggs, 27 Hoffmans R., Essendon, 3040 (*Botany*).
Mr. Robert C. McKenzie, 50 Darebin Drive, Thomastown, 3074 (*Mammal Survey*).

Joint:

Mr. Robert D. Graham and Mrs. Elsie C. Graham, 147 Broadway, Reservoir, 3073 (*Mammals and Entomology*).
Mrs. Ula Kunert and Miss Carol Kunert, 100 Wells Rd., Beaumaris, 3193 (*Marine Biology*).
Mr. Paul Dredge and Mrs. P. Dredge, 3/9 Kelso St., Frankston, 3199 (*Mammal Survey*).

Country:

Mr. D. G. Jackson, 7/147 Macpherson St., Waverley, N.S.W., 2024 (*Mammals*).

Junior:

David Saunders, Res. 1, Willsmere Hospital, Kew, 3101 (*Mammals*).

Monday, 8 April — Mr. Geoff Douglas (Vermin and Noxious Weeds Department).

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Thursday, 14 March — Botany Group. "Some Plant Associations in Rushworth Forest": Mr. B. Fuhrer.

Wednesday, 20 March — Microscopical Group Meeting.
after lunch to be on board by 1.15 p.m. Bookings now closed. Those on waiting list please contact Mrs. Strong 56-2271 by 14 March.

Thursday, 21 March — Day Group. Inspection of Port of Melbourne by Harbor Trust Launch "Commissioner"; leaving No. 7 North Wharf. Proceed to launch

Thursday, 28 March — F.S.G. Meeting in Conference Room, National Museum at 8.00 p.m. Annual Meeting with Chairman's Address: "Micro-anatomical Methods". **Camp** — 9 to 11 March, Warby Ranges — Whitfield area.

Monday, 1 April — Marine Biology and Entomology Group meeting in Conference Room, National Museum at 8.00 p.m.

Wednesday, 3 April — Geology Group.

Thursday, 4 April — M.S.G. Meeting at Arthur Rylah Institute, 123 Brown St., Heidelberg at 8.00 p.m.

F.N.C.V. EXCURSIONS

Sunday, 17 March — Maranoa Gardens. Leader Mr. A. Fairhall. Meet at the Beckett Park entrance in Parring Rd. at 2 p.m. If travelling by tram alight at stop 54 on Mont Albert line.

Sunday, 1 September, to Sunday, 8 September. — Kangaroo Island. This excursion will start from Adelaide and includes Motel accommodation on the Island, air travel between Adelaide and Kangaroo Island, and day excursions at the cost of approximately \$135. Starting from Adelaide will enable members to spend extra time in S.A. if desired but a group booking can be arranged on the train if members wish to travel on the same day.

A \$25.00 deposit should be paid to the Excursion Secretary when booking.

pear thin and delicate are in fact difficult to snap off by hand.

A search for an apt term to describe this kind of rock surface yielded the adjective *muricate*, which the Oxford English Dictionary defines as 'furnished with sharp points, studded with short, hard excrescences'. This is certainly the impression gained from experience on the intricately-pitted rocks at Jubilee Point, and from it we may derive the terms *muricate texture* to describe the pitted surface and *muricate weathering* for the process (or combination of processes) that produced it.

Muricate weathering should be distinguished from honeycomb weathering (also known as alveolar weathering) which is found at higher levels on the cliffs of the Nepean coast. Honeycombs develop where a slightly hardened rock surface has been locally breached to form cavities that open out in the less resistant underlying rock. They are typically larger and more regular than those of muricate texture, and their internal walls are smooth, with soft, flaking sandstone, whereas the pitted surfaces in the spray zone are rough and hard. More-

over, honeycomb weathering occurs on a variety of fine-grained rock outcrops, inland as well as on the coast, whereas muricate weathering seems to be confined to the spray zone on rocky shores of calcareous sandstone or limestone.

Attempts to explain how pitted rock surfaces form soon run into difficulties because of the rich variety of physical, chemical and biological processes active on this rocky coast, many of which could contribute to this kind of weathering. Observations and experiments conducted over the past few years at Jubilee Point will serve as a basis for further discussion.

The shore platform at Jubilee Point stands 0.3 to 0.5 metres above mean low tide level, and as mean tide range here is about a metre the pitted rocks are in a zone frequently splashed by surf and spray, especially at high tide and when a heavy swell is running. However, on sectors directly exposed to storm wave attack (as in adjacent Diamond Bay, where there is a broad gap in the shore platform) the cliffs are cut back to expose fresh dune sandstone, and the intricately-pitted rock surfaces are missing. They are



Plate 2

also suppressed wherever wave action mobilises sand or gravel to produce a smoothly-scoured abrasion surface. Delicately-etched pitting is best developed where the waves have broken across a broad shore platform, so that these rock surfaces are splashed by surf and spray, but escape the direct impact of ocean waves. Occasionally a pinnacle of rock may be snapped off by wave impact, exposing an outcrop of fresh, unweathered sandstone, on which the re-development of a pitted surface may be observed (see below), but it is clear that the pitting is not simply due to wave action: the pits are not percussion-marks or impact-craters.

Rock surfaces can be physically weathered as the result of a sudden change of temperature, especially in arid regions and environments subject to frost action. Such rapid heating and cooling does not occur, however, on the Nepean coast. As an experiment, pitted rock surfaces at Jubilee Point, dried and warmed by the sun on a February day when shade temperature reached 35° C. were sprayed with sea water (18° C.), but no disintegration resulted.

Some form of chemical corrosion effective in the zone above the level of the shore platform must contribute to the development of pitted surfaces. The dune sandstone is rich in calcium carbonate, present as grains of fragmental limestone as well as the cementing material which binds these, and other grains of quartz sand, together. This kind of rock can be corroded by rain water, which is acidified by the presence of dissolved carbon dioxide, acquired as it falls through the atmosphere. At Jubilee Point (which must receive a mean annual rainfall similar to that reported by the Bureau of Meteorology for Cape Schanck — about 750 millimetres) the dune sandstones wetted by rain can become pitted as the result of the

solution of calcium carbonate and the release of insoluble quartz sand grains from the cement that binds them.

However, this can only be a partial explanation, for pitting is as well developed on the roofs of caves and the under-surfaces of protruding rock visors as it is on surfaces directly exposed to rainfall. Rain water that has percolated through dune sandstone becomes saturated with carbonates in solution, and thus incapable of further corrosion; indeed, such water percolating out of the roof of a cave may instead precipitate calcium carbonate to form small stalactites (dripstones).

Corrosion of the rocks at Jubilee Point could be due to the action of spray and surf to which they are frequently subjected. The problem is that still sea water is usually already saturated with dissolved carbonates, and so not corrosive. It is significant that the shore platform has developed at a level where the rocks are kept almost permanently soaked by sea water and therefore preserved from the corrosion taking place at a slightly higher level. But if still sea water is usually carbonate-saturated, highly aerated surf and spray may be richer in carbon dioxide content, and thus able to contribute to the corrosion that produces pitted rocks. This effect would be enhanced at times when sea water is superficially diluted and acidified by rain water after wet weather.

Another contribution may come from repeated wetting and drying, a process which leads to disintegration of certain kinds of rock, notably fine-grained shale, mudstone, or basalt (Ollier 1969). Reference to tide tables shows that rock outcrops at high neap tide level at Jubilee Point were washed by the sea during each of the 705 high tides that occurred during 1973. They were also wetted at other times by rainfall and the condensation of dew. Drying out could

have occurred for a few hours during low tide whenever this coincided with low atmospheric humidity, especially on warm and windy days. However, laboratory experiments with samples of pitted dune sandstone subjected to 50 cycles of wetting (with distilled water) and drying yielded no evidence of development or enlargement of pitting, and it is doubtful if this process contributes much to muricate weathering.

Nevertheless, repeated wetting and drying of the dune sandstone in the spray zone could explain the hardening of its surface layers at Jubilee Point compared with outcrops of the same formation in the eroding cliffs at the head of adjacent Diamond Bay: the former ring when hit with a geological hammer, the latter crumble. It is possible that additional calcium carbonate, dissolved when the rock is soaked, becomes concentrated and precipitated in the surface layers as it dries out in such a way as to toughen the outcrop in sectors frequently wetted and dried. If so, this should be considered a contribution to the development of intricately pitted rock, for the delicately-etched pits and pinacles could not evolve and persist on soft dune sandstone.

Where sea water collects and dries out in shallow rock basins salt crystals may form, and these can cause physical plucking, and perhaps chemical corrosion, of the adjacent rock surface. Experiments with samples of pitted dune sandstone subjected to 50 cycles of wetting and drying using sea water showed that microscopic salt crystals can form when the thin film of sea water adhering to the rock surface evaporates, but no evidence was found of rock weathering by this process.

Biological activity can contribute to rock weathering, either physically, as when plant roots probe crevices, or

shelly organisms drill, scrape, or pluck a rock surface, or chemically, as when plants or animals exude corrosive fluids. Marine organisms are plentiful in the spray zone at Jubilee Point, and such processes could have contributed to the development of pitted rock surfaces. Algae colonise pores and crevices in the rock to a depth of 2 or 3 millimetres (sunlight penetration for photosynthesis being the limiting factor), and the upper and supra-littoral zones are inhabited by shelly organisms such as barnacles, limpets, chitons and periwinkles. The small bluish periwinkle *Melarapha unifasciata* is abundant in the pitted zone, being a species that can withstand the occasionally hot and dry conditions (Dakin 1952). It moves across the irregular surface, browsing the algae. In thin section the algae which penetrate the rocks are seen to have blue-green filaments that darken towards the surface, thus contributing

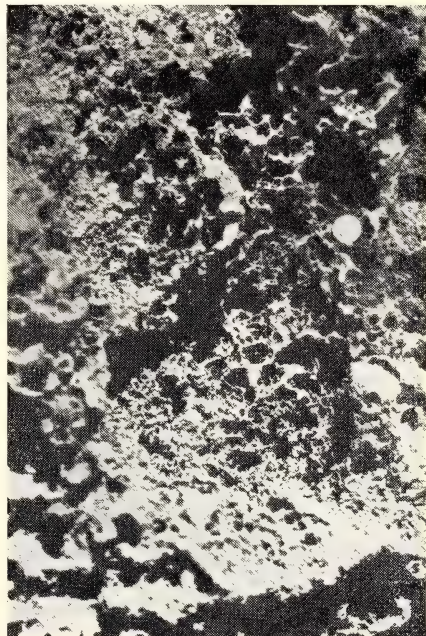


Plate 3

to the grey colour of weathered dune sandstone in contrast with the yellow or light brown of unweathered outcrops. Other algae form bushy carpets and outgrowths on the pitted surface, and these, too, are grazed by shelly organisms.

Moisture within the rock, whether derived from rainfall or from the sea, is acidified as the result of the presence of algae, particularly by the carbon dioxide generated as they respire. In the day time much of this is taken up in photosynthesis but at night, when photosynthesis stops, an excess of carbon dioxide acidifies the moisture, rendering it corrosive and thus contributing to pitting.

It is possible that the shelly organisms which browse the algae also contribute to disintegration or decomposition of the rock surface. There is no simple correlation between the sizes and shapes of pitting and the

dimensions of the shells, and it is clear that the pits have not been simply 'eaten out' by the animals that inhabit the rock surface, but sand grains may be loosened and carbonate cement weakened as the result of the activities of periwinkles and other shelly organisms.

Separating these physical and chemical effects of biological activity from the physical and chemical processes at work independently is almost impossible. To do so would require long-term observation of changes proceeding on a natural rock surface, tenanted by marine organisms, in comparison with an equivalent control plot, from which these organisms were somehow excluded. Establishing and maintaining such an abiotic control plot without using physical or chemical agencies that would invalidate the experiment could perhaps only be achieved by sustained lethal radiation. This has not yet been attempted at Jubilee Point.

Examination of processes at work on a rock surface that is already pitted is one approach to the problem of deciding how such pitting develops. Another is to trace the changes that occur as weathering proceeds on a freshly-exposed surface of dune sandstone. An opportunity to do this arose early in 1968 when a pinnacle of pitted dune rock at Jubilee Point snapped off to expose a small area (about 1500 square centimetres) of pale yellow unweathered dune sandstone (Plate 4). This has since been regularly examined and photographed.

By February 1970 the exposed surface had been colonised by algae, and had changed in colour to a grey only slightly paler than that of the surrounding pitted rock. Browsing shells had arrived, but the surface remained smooth. Early in 1974 the features were similar (Plate 5), except that the surface had been slightly roughened

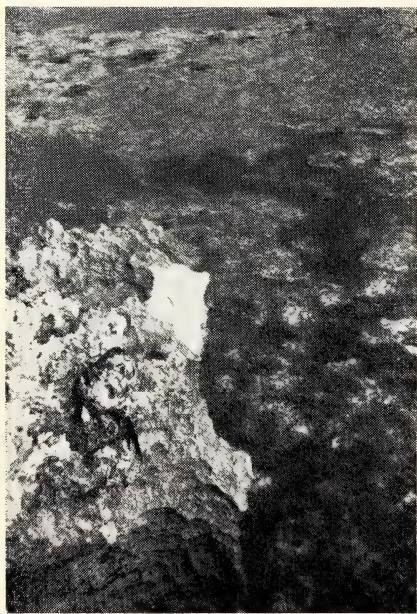


Plate 4

where sporadic sand grains or rock particles had been loosened and removed, leaving paler scars 1 or 2 millimetres in diameter. Similar scars were also noticed on the surrounding pitted rock surface.

Corrosion by chemical processes (including those resulting from occupation by marine organisms) is the most likely cause of this patchy disintegration. In time, the patches will widen and deepen, and develop into pits similar to those on the surrounding rock, but it will be many years before the surface exposed in 1968 becomes indistinguishable topographically from the intricately-pitted rock surfaces that surround it. Any sug-

gestion that muricate texture is the outcome of rapid weathering, with appreciable changes in the course of a few years, is thus erroneous. The evidence from Jubilee Point indicates that muricate weathering proceeds very slowly; it could take decades, perhaps centuries, to develop this kind of intricate pitting of rock surfaces.

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Plate 5

Notice to Contributors

It is important that material submitted for publication should preferably be typewritten on foolscap or quarto sheets at double spacing, and with a 2.5-3 cm (1") margin on the left. No underlining of words should appear unless absolutely necessary.

Where dates occur, the day should precede the month, e.g. 15 May 1972 **not** May 15 1972.

Pollination Experiment, Performed on *Cryptostylis subulata*

by M. DACY

I. INTRODUCTION

(a) **Orchidaceae.**

This family of flowering plants represents the highest development and specialisation of the monocotyledonous flower. It is world-wide in distribution, has many genera (450) with over 10,000 species of perennial herbs which are usually terrestrial in the temperate zones, and mostly epiphytic in the tropics. A few species are saprophytic. Victoria has 171 listed species (Willis, "A Handbook to Plants in Victoria," Vol. I, 1969), although several new species have been discovered since, e.g., *Corybus fordhamii*, *C. hispidus*, *Calochilus herbaceus*, *Pterostylis coccinea*.

The leaves are simple and entire. They may be arranged along the stem or they may arise from a tuberous rhizome. Sometimes the leaves arise from a short side shoot from the base of the stem as in *Pterostylis reflexa*.

The flowers are mostly hermaphrodite and zygomorphic. The floral segments, usually all coloured, are six in number and are arranged in two whorls of three. Of the three sepals which form the outer whorl, the two laterals are paired and similar in shape and size, while the third is often modified into a hood. The three petals of the inner whorl have two similar laterals, i.e. alike in size and shape, while the third petal, called the labellum (or tongue), is often greatly modified. Frequently, it is covered with glands; it may be highly irritable, and is the chief organ concerned in insect pollination. Often "the ovary or flower is twisted so that the labellum is at the front and the odd

sepal at the back of the flower". This quotation is from Ewart's "Flora of Victoria", in his section on Orchidaceae. Certainly, in most Victorian species, with the exception of the genera *Spiculaea*, *Prasophyllum* and *Cryptostylis*, the dorsal sepal lies next to the flowering stem while the labellum occupies a position furthest from the stem, and closest to an investigating insect.

In spite of the great diversity of structure, colour, texture and size of orchid flowers, the most constant feature is the column. The column consists of the filament of a single stamen fused with the style, so that there is a single anther, with the stigma beneath it, the two often being separated by a projection or rostellum. There are slight variations in the number of stamens in about one per cent. of the species. The pollen grains of orchids are usually not dry and powdery, but adhere in masses called pollinia, which vary in number from two to eight. Few insect visits are needed, as one set of pollinia is sufficient to fertilise thousands of ovules.

Although the plants are generally insect-pollinated, the seeds of the family are mostly wind-dispersed, as they are very small, and thousands in number. Each seed has but a rudimentary embryo with no endosperm.

The ovary is inferior, often with ridges showing the positions of the three carpels. There is one locus with parietal placentation of the ovules along three longitudinal ridges. The fruit capsule is rarely fleshy or

indehiscent. Often the very small numerous seeds escape through the openings of the dry dehiscent capsule and are carried away to new situations by air currents.

It is thought that on germination of the seed, the young plant becomes infected with a fungus called a mycorrhiza, which helps to feed the young plant saprophytically. (Harmon). Fungal mycorrhiza are known to be in association with the saprophytes *Gastrodia sesamoides*, the potato orchid or cinnamon bells (Ethel I. McLennon, in Aust. J. Bot., December, 1959, pp. 225-291, reference given in Willis), and with the hyacinth orchid *Dipodium punctatum* (Ewart, "Flora of Victoria"). Mycorrhiza are thought to be associated with all epiphytes and most terrestrials (Harmon). Work needs to be done here.



Plate 1

Photo: Author.

(b) *Cryptostylis subulata*.

(i) *Description*. This showy red orchid, a photograph of which is included above (Plate 1) is found in swampy situations. There are five Australian species, of which four are found in Victoria. The floral segments assume the primitive position, i.e. the labellum is nearest the stem, and is the most conspicuous organ, while the remaining five segments are smaller, pointed, narrow, yellowish in colour and hardly noticeable. Figure 1 shows a floral diagram (adapted from Ewart's "Flora of Victoria") to illustrate the relationship between the positions of the floral parts and the pedicel.

Plant height is from one to three feet, the stem is cylindrical, sometimes brittle, while the relatively large (leaf lamina, up to four inches long and petiole, three inches), radical, gum-like leaves have a prominent mid-rib. The leaves are green on both upper and lower surfaces, not purple beneath as in the related and associated species *Cryptostylis leptochila*. The two or three leaves have rigid petioles.

Flowers, three to six in number, arise in the axils of membraneous bracts, on very short stalks. They are arranged in a raceme. The lateral sepals measure about 22 mm in length, the odd sepal, 2 cm, the lateral petals 12 mm, and the labellum, nearly 2 cm. The large red labellum has longitudinal dark lines, three long ones in the centre and shorter ones on each side, the three long ones terminating in a large red boss. On the expansion of the lamina, the sides of the labellum turn upwards, giving the characteristic tongue-like appearance. After fertilisation or when withering, the tongue sides turn down again. These stages may be seen in the photograph (Plate 1).

The very short column (about

3 mm) is situated in a cavity or swelling at the base of the labellum lamina, hence the name "*Cryptostylis*", which means "hidden style". The large green inferior ovary, about 8 mm long, shows the carpel ridges very distinctly.

The anther, about 5 mm wide and 2 mm high, has four pollinia, which adhere by their pointed ends to a brown sticky disc, clearly visible in a close-up slide of the orchid. The column is short and broad, and is produced laterally and posteriorly into glandular or membraneous margins behind the anther. The fawn sticky disc is situated at the upper border of the large stigma.

ii. *Insect Pollination.* The method of pollination of this Australian orchid is unique and world famous. Mrs. Edith Coleman, in 1927, published a paper reporting that the Australian genus *Cryptostylis* was pollinated by a male ichneumon wasp, *Lissopimpla*. She was the first to record this observation, which has been authenticated by many workers since. Mrs. Ilma Dunn of Melbourne, a photo-

grapher and field naturalist, has movies of the actual pollination procedure in both *Cryptostylis subulata* and *Cryptostylis leptochila*, in the one colony. A field naturalist (Mr. Ian Morrison of Melbourne) told me, that on carrying some *Cryptostylis* flowers from his garage where they were kept over-night, across an open space towards his house where he hoped to photograph the pollination process, wasps zoomed down suddenly as the flowers were first exposed to the morning air. This is an indication that the insects were lured by scent. A naturalist writing in the Herald, noted some males were seen to prefer orchid blossoms to the female wasps, when all were enclosed in the one jar. The male wasp, on pollinating a *Cryptostylis subulata* flower, clasps the labellum near the boss or hump (see Plate 2 for the photograph) so that it is in a horizontal position. The tip of the abdomen is then placed into the hollowed flower base, in pseudocopulation. The insect, on flying away to another flower to repeat the process, has the four pollinia glued to the tip of its abdomen by

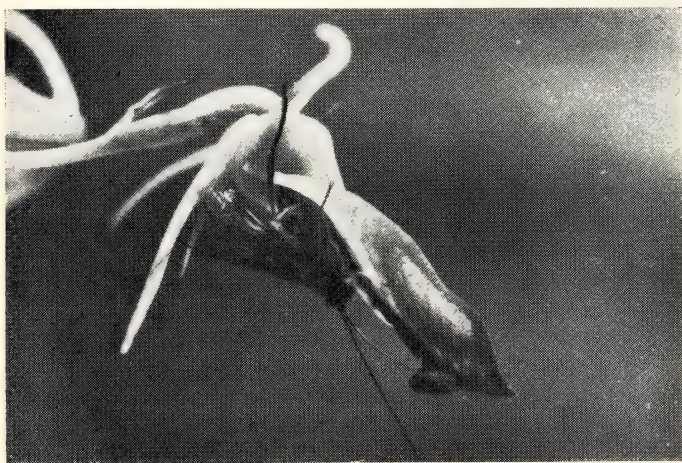


Plate 2.

Photo:
Mrs. I. Dunn

the fawn sticky disc. In this way, pollinia are carried to another flower, and cross pollination occurs, Fig. 2.

II. POLLINATION EXPERIMENT
(a) AIM. The aim of this experi-

ment was to find out if the orchid, *Cryptostylis subulata* were self-pollinated in addition to being cross pollinated—for which the flower is specially adapted. Also a question to

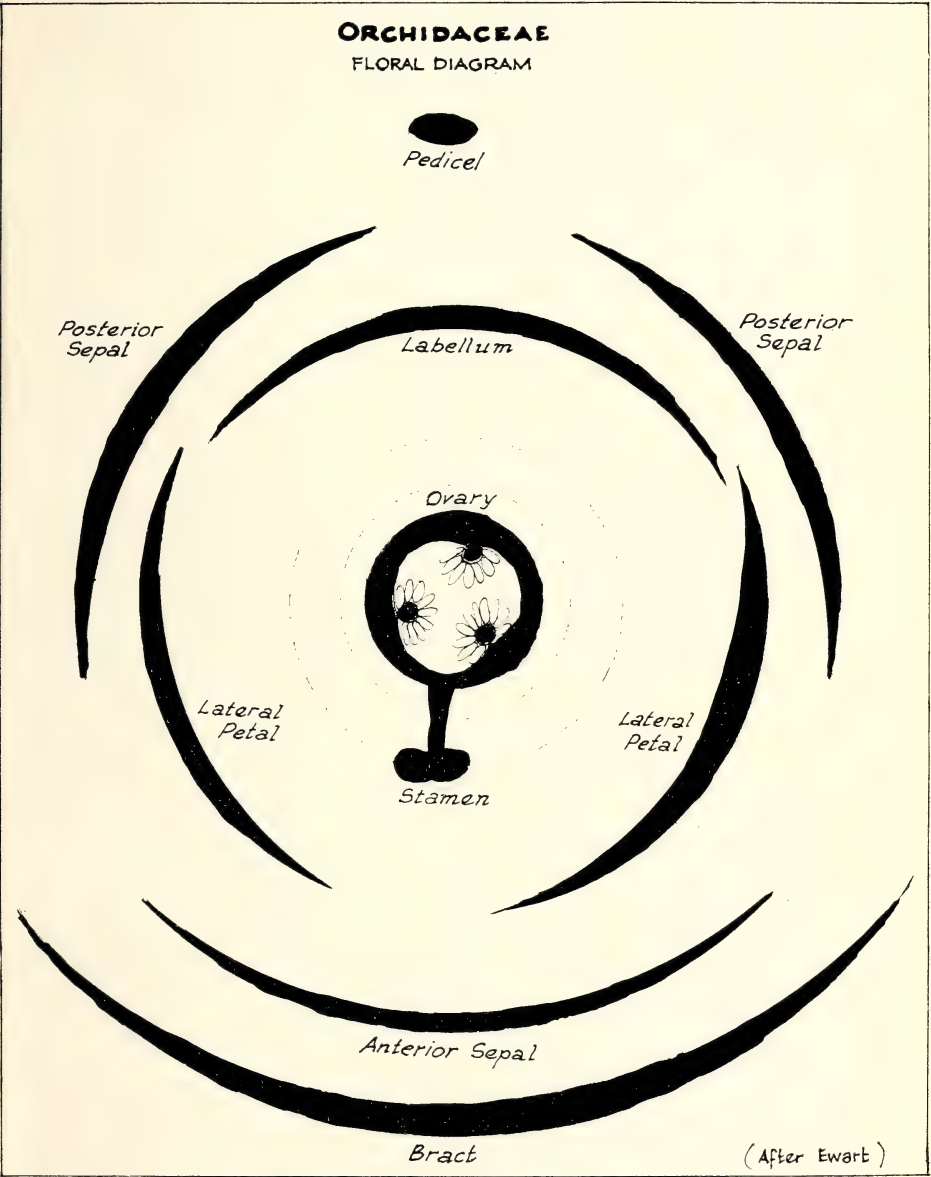


Figure 1

be answered was, "If there is no evidence of self-pollination, how effective were the necessarily few visits by the special pollinator, as noted by the subsequent swelling of the ovary into fruit?"

(b) METHOD.

(i) *Selection of Areas.*

Two areas were selected — one at Lakes Entrance and one at South Belgrave. The colony near Lakes Entrance was in a little-known and undisturbed location. The swamp habitat of this group is illustrated by the photo, Plate 3. The second area was at South Belgrave in a light forest habitat, and near a guide camp.

(ii) *Experiment.*

On 1 January, 1970, at the Lakes Entrance locality, which I will call Area No. 1, and on 22 December, 1969 at the South Belgrave area, called Area No. 2, terylene bags were placed over selected, unopened flowers whose segments were closely folded — one bag covered one bud, and one bag only, was placed on each selected plant (except in two cases, mentioned below).

The terylene bags were pale grey in colour, and of a weave suitable to allow air to penetrate easily. They were tailored to fit the buds which were remarkably uniform in size, in both areas — being about $1\frac{1}{4}$ inches long. The hood, in each case, was large enough to allow for the expansion of the labellum. In the bud stage, the turned-down edges of the labellum tightly enclosed the inner parts, which would prevent insect pollination. Much liquid, probably nectar, was at the base of the unopened bud. It is hoped to investigate this matter, by means of the refractometer. The drawstring of each terylene bag was drawn carefully so as not to behead

the flower, and to partially expose the ovary. In each case, the bud selected was the first one above the uppermost open flower.

In Area No. 1 (Lakes Entrance). Six orchid plants, each had one bud covered by a terylene bag; and one plant, the first mentioned in Table 1, had all the buds above the opened and fruiting flowers covered.

In Area No. 2. Four plants each had one bud covered, and one plant had all its apical buds enclosed in a larger terylene bag. See Table 3 for Area No. 2, the third entry in the list, in the first column. The second column in both Tables 1 and 3 for both areas, shows the number of mature flowers in bloom, the number withered and the number fruited, if any, at the beginning of the experiment — the dates are included in the tables.

One Gippsland plant showed an ovary developing at the beginning of the experiment.

Plants were checked to see if hoods remained on after wind and rain storms, on 2 January, 1970, at Lakes Entrance, and at South Belgrave, on 16 January, 1970. Plants were left until all had flowered and withered, that is, 6 March in the case of Area No. 1 at Lakes Entrance, and 21 February, 1970, for Area No. 2 at South Belgrave.

(c) RESULTS. On 6 March, 1970, at Lakes Entrance, and on 21 February, 1970, at South Belgrave, the ovaries of the hooded flowers were examined. No fruiting, indicated by the swelling of the ovary, was observed in any flower hooded in the bud stage. In Area No. 1 at Lakes Entrance (see Table 2) five plants developed fruit from flowers not hooded, while three of the experimental plants developed no fruit at all. In Area No. 2 at

South Belgrave (see Table 4) neither hooded or uncovered flowers in five experimental plants, developed fruit.

Referring to Table 2 for Area No. 1 and to Table 4 for Area No. 2, the last two columns list the number of fruited and non-fruited flowers (including hooded ones) on each of the experimental plants. At the end of the experiment on 6 March, 1970, no expansion of the ovary in the hooded flower was apparent, but two swollen fruit appeared above the bag and two below.

In Area No. 1, the large terylene bag, which covered the apical buds, was slit open to show the absence of any fruit within the bag, while a large fruit had developed immediately outside it.

A census was made of fruit and non-fruited ovaries on plants of *Cryptostylis subulata* at Lakes Entrance in Area No. 1 on 6 March, 1970, and also at Area No. 2 at South Belgrave on 21 February, 1970. Hooded plants were not included in the count. Table 5 is a record of the count.

Twenty plants, numbered 1 to 20 in the first column of Table 5, were examined at Area No. 1 at Lakes

Entrance on 6 March, 1970. Beside the numbered plants, in column two, is recorded the number of non-fruited ovaries for each plant, while in the third column the number of fruit formed by each plant, is recorded.

Forty-nine plants were considered in Area No. 2 at South Belgrave. On 21 February, 1970, the numbers of fruits and non-fruits found on each individual plant were recorded on columns adjacent to the numbered plants. From the figures beneath the chart in Table 5 it is clear that in Area No. 1, at Lakes Entrance, 33% of the total number of flowers examined formed fruit. However, if the number of plants with some fruit formed is considered, we notice 18 out of 20 plants fruited in some degree, that is 90% of the plants fruited.

Again, by noting the figures beneath Table 5, it is seen that in Area No. 2 at South Belgrave, 10% of the flowers examined on 21 February, had fruited. Out of 49 plants of *Cryptostylis subulata* in the area on the same date, 50% bore some fruit.

Plate 3.



Photo: Author.

In Area No. 1 at Lakes Entrance, out of 89 flowers of *Cryptostylis subulata* examined, 29 fruited, while 60 did not. For Area No. 2 at South Belgrave, out of 299 individual flowers examined, 31 fruited, while 268 flowers developed no fruit.

A contingency table may be drawn up from data from the Tables 1, 2, 3, 4, 5.

(d) CONCLUSION

No self-pollination occurred in any flowers of *Cryptostylis subulata*, hooded in the bud stage. The orchid is dependent on insect pollination, known to be by a male wasp.

How effective is this specialised pollination of *Cryptostylis subulata*? The answer is 33 per cent. in the Gippsland area No. 1, and 10 per cent. in Area No. 2, at South Belgrave. The lower figure for Belgrave may be due to passing traffic, horse-riders, and to the presence of the inhabitants of the camps close-by. Also the area is well known to orchid photographers. The insect pollinators may be frightened away, or they may be less in numbers than in country areas, due to lack of habitat, because of human habitations, or because of spraying by nearby farmers and householders.

III. DISCUSSION

Pollination experiments, similar to the one described above, would need to be done in many areas, and over a period of several years, to obtain sufficient evidence for a firm conclusion. However, the evidence I have collected indicates no self-pollination, since no covered buds of *Cryptostylis subulata* developed fruit. The relatively massive weight of pollinia compared with that of individual pollen grains precludes wind-pollination in general. Professor Canny mentioned that the English bee-orchid is wind-pollinated. The pollinia, anchored to the anther by a sticky substance, are ejected from the anther

shell and dangle under the influence of gravity. The wind blows the pollinia against the stigma situated **near** the anther. The extremely sticky nature of the pollinia cause them to adhere strongly to the stigma where self-pollination occurs.

That the Australian native orchid, *Cryptostylis subulata* is cross-pollinated by a male wasp, is well authenticated by many observers. The bright red labellum with guide lines, attracts insects, not for pollen, but for pseudo-copulation. This is a unique association between an insect, and an orchid especially adapted to it, by imitating the scent and appearance of a female wasp.

Faegri, in his book on "Pollination Ecology", lists one attractant for biotic pollinators, as being sexual. He suggests that the flower of "the Orchid *Ophrys* acts on the sense organs of sexually unsatisfied male Hymenoptera, causing them to make the same instinctive reactions leading to copulation. This occurs in such a position that the insect touches the rostellum with its head and carries off the pollinia. The sexual urge is not satisfied because it flies to another plant and repeats the performance".

In a colour slide, submitted by Mrs. Dunn of Melbourne in the 1970 "Photoflora", a photographic competition, I observed the four pollinia attached to the tip of the abdomen of a wasp flying away from a flower of *Cryptostylis leptochila*, the small tongue orchid. It is thought that the other Victorian species of *Cryptostylis* are similarly pollinated (Ed. in Nicholl's "Orchids of Australia"). Movies and colour slides show *Cryptostylis subulata* and *Cryptostylis leptochila* to be wasp-pollinated. *Cryptostylis huntiana*, a rare species found in East Gippsland, shows a column of similar size and structure to that of *Cryptostylis subulata*. More-

combe, in "West Australian Wild-flowers" Page 64, shows colour photographs of the pollination of the slipper orchid *Cryptostylis ovata* (which is very similar to *Cryptostylis subulata*), by a wasp.

Studies on insect psychology are difficult. When the mating instinct is strong within the wasp, it may be oblivious to the shape of the orchid, which in no way resembles the body of a female wasp. One speculation (Morecombe), is that the ultraviolet rays (and others) visible to the insect, may take on the shape of a female wasp. It is known that insects visit flowers which are red to us (as in the *Cryptostylis subulata* labellum) but in fact they may be attracted by the reflected ultra-violet light which we do not see (Morecombe).

The eyes of insects detect a range of wavelengths of light shifted towards the ultraviolet. It is possible that the guide lines on the labellum of *Cryptostylis subulata* are visually brighter than the rest of the flower to an insect. The eyes of an insect are compound, and an image would not have clear definition. The labellum of *Cryptostylis subulata* may re-

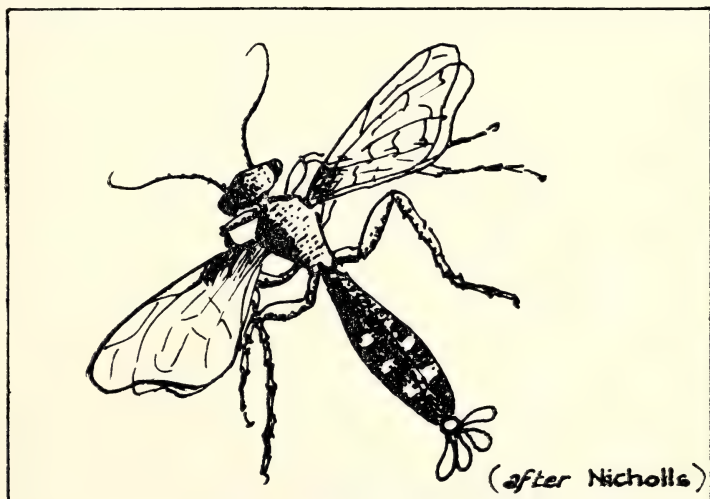
semble the body of a female wasp to an infatuated insect.

Insect mimicry is also seen in the elbow orchid, *Spiculaea huntiana*, in which the end of the jointed labellum may look like an insect to a flying predator. The labellum swings to and fro, by means of a hinge, in the slightest breeze. I have observed this many times. Two glistening dark glands form the "eyes", hairs are shaped like wings, and variations in colour resemble the positions of the thorax and abdomen.

Experiments similar to the above have not been performed on the other species of *Cryptostylis* to see if self-pollination occurs. If there is no self-pollination, and the genus *Cryptostylis* is adapted to the visits of one particular type of insect vector, these orchids are in danger of extinction, if the insects are killed by insect sprays. T. R. Oxlee, in an article called "Keeping the Earth Fit for Man", in the 1970, June-August number of the periodical "Victoria's Resources", says, "The most destructive Mammal is Man, who in the last two centuries has caused the extinction of not less than 70 other kinds of mammals" (he

Figure 2

Pollinia is attached to tip of abdomen.



Drawn: Author

is referring to the extinct blue whale), "150 species or sub-species of birds, and an unknown number of species of plants, reptiles, amphibians, fishes, insects and other animals. The result is that the world community of living plants and animals is becoming much less diverse. By this, we mean that the number of different kinds of creatures is becoming less, whilst the number of individuals in a few species is becoming large."

Liquid observed at the base of the bud of *Cryptostylis subulata* may have been nectar, and I hope to test this one summer, by means of the refractometer. If the liquid is nectar, it may be an evolutionary remnant of the stage when cross-pollination was performed by a nectar-drinking insect, the pattern gradually changing, perhaps due to a shortage of females at some period. I have not read of pollination of this orchid by other insects, but it is possible.

According to Faegri, in "Pollination Ecology", if the pollination attractant is olfactory, the insect has an erratic approach to the flower and the approach is from the windward side. A naturalist observed, in the Herald, that the wasp flies criss-cross, backwards and forwards, along a line which leads to a sighting of a flower of *Cryptostylis*. He then suggests that the sense of sight comes into play as the insect now darts down to the flower. The scent emitted is not perceptible to humans.

Percival, in "Floral Biology", lists the functions of the stigmas,

(i) to capture the pollen,

(ii) to provide a suitable surface for the germination of the pollen grains. He also says that it is not known which part of the stigmatic area is the receptive region. In *Grevillea rosmarinifolia* the stigmatic disc to which the pollen grain adheres is not the stigma. The stigma matures

later as a pinpoint in the centre, which is free from pollen. *Grevillea rosmarinifolia* cross-pollinated and it is possible that self-pollination occurs later.

The tentative conclusion gleaned from the pollination experiment performed on *Cryptostylis subulata*, is that the orchid is not self-pollinated, but depends for its fertilisation on a few visits by a special type of insect vector, to which the flower is specially adapted. About one-third of the flowers were fertilised in a remote area (Lakes Entrance), and about one-tenth of the flowers in an area near Melbourne (South Belgrave).

The fertilisation rate is not high. We do not know the percentage germination of orchid seeds nor do we know what percentage of germinated plants survive. Also, we do not know how many years the *Cryptostylis* plant lives. It survives the winter season by means of its fleshy or tuberous rhizomes—several of which grow underground from the stem base.

IV. NOTES

1. To be effective, pollination experiments must be done with plants in the native habitat, rather than in a glass-house, because of the required association with the insect vector.
2. Because of the scarcity and rarity of most native orchids in Victoria, I cannot destroy or even find too many for experimentation.
3. A great deal of travelling to country areas is required.
4. I have kept some of the pressed hooded specimens of *Cryptostylis subulata* used in the experiment.

Acknowledgements

I wish to thank and to acknowledge the help of the people who generously assisted in the carrying out and the recording of the orchid pollination experiment, described above.

Miss Ruth Clark of Lakes En-

trance, field naturalist and artist, who has painted about 130 species of Victorian native orchids in water-colours, directed me to a conveniently placed colony of large tongue orchids in a little-frequented locality, close to Lakes Entrance. She inspected the experimental plants during the course of the test.

Mrs. Ilma Dunn of Melbourne, photographer and field naturalist, presented me with colour slides of the wasp pollination of *Cryptostylis subulata* and *Cryptostylis leptochila*. She also permitted me to see her movies of the same process.

Typing was done by senior students of the Whitehorse Technical College, and by Mrs. Margaret Schafer.

Mr. O. Raits, a fellow teacher at the Whitehorse Technical College, did some of the hand-printing associated with the diagrams and the photos.

My husband assisted in the census count, and set up and illuminated his small dissection microscope so that I could see the detailed structure of the column of the orchid. His interest in this project was encouraging.

Dr. D. M. Churchill, then of the Monash University, Botany Department, gave careful directions which

enabled me to prepare an improved version of the original account.

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 T. R. Oxlee. "Victoria's Resources." 12. No. 2. June-August 1970. Article called "Keeping the Earth Fit for Man".

***Cryptostylis subulata*.**

Results:

AREA NO. 1

LAKES ENTRANCE. SWAMP HABITAT.

1 JANUARY, 1970.

TABLE 1

BUDS COVERED	FLOWERS OUT BELOW COVERED BUD
All Top Buds	1 out, 1 finished and its ovary swelling.
1	1
1	2 out, 3 finished.
1	1 out, 1 finished.
1	1 out, 2 finished.
1	1 out, 3 finished.
1	2 out, 1 finished.

AREA NO. 1

6 March, 1970.

TABLE 2

FLOWERS OUT	NON-FRUITS	FRUITS
0	7	1
0	6	0
0	7	0
0	2	2
0	3	1
0	3	1
0	3	4
0	5	0

Cryptostylis subulata.

Results:

AREA NO. 2

SOUTH BELGRAVE. LIGHT FOREST.

22 DECEMBER, 1969.

TABLE 3

BUDS COVERED	FLOWERS OUT BELOW COVERED BUDS
1	1
1	1
All Buds Covered	0
1	0
1	1

21 FEBRUARY, 1970.

TABLE 4

FLOWERS OUT	NON-FRUITS	FRUITS
0	9	0
0	6	0
0	0	0
1	8	0
0	0	0

TABLE 5

CENSUS OF FRUITS OF CRYPTOSTYLIS SUBULATA

LAKES ENTRANCE (6 - 3 - 70)			SOUTH BELGRAVE (21 - 2 - 70)					
No. of Plant	Non-Fruits	Fruits	No. of Plant	Non-Fruits	Fruits	No. of Plant	Non-Fruits	Fruits
1	2	1	1	4	2	26	5	2
2	3	3	2	8	0	27	5	0
3	5	2	3	8	1	28	4	3
4	2	1	4	8	3	29	4	4
5	4	1	5	7	2	30	8	0
6	2	2	6	3	1	31	9	0
7	3	1	7	6	0	32	2	0
8	6	1	8	6	0	33	7	0
9	1	1	9	7	0	34	3	0
10	3	0	10	8	0	35	4	0
11	1	2	11	5	1	36	11	0
12	5	2	12	5	2	37	6	0
13	3	2	13	6	1	38	7	0
14	2	1	14	4	1	39	3	1
15	4	0	15	3	0	40	3	1
16	3	1	16	7	0	41	3	1
17	2	1	17	5	1	42	6	0
18	4	1	18	5	1	43	5	3
19	4	2	19	5	0	44	4	0
20	1	4	20	7	1	45	6	0
			21	2	0	46	3	0
			22	6	0	47	6	0
			23	7	0	48	4	0
			24	5	1	49	5	0
			25	6				

No. Non-Fruits	60	No. Non-Fruits	268
No. Fruits	29	No. Fruits	31
Total No. Flowers	89	Total No. Flowers	299
Percentage Fruits	33	Percentage Fruits	10
Total No. Plants	20	Total No. Plants	49
No. of Plants with Fruit	18	No. of Plants with Fruit	29
Percentage Plants with Fruit	90	Percentage Plants with Fruit	59

TABLE 6

AREA NO. 1.

LAKES ENTRANCE

6 MARCH, 1970.

	NUMBER OF PLANTS WITH SOME FLOWERS COVERED	NUMBER OF PLANTS WITH ALL FLOWERS UNCOVERED
Number of Plants with Seed	5	18
Number of Plants with no Seed	3	2

TABLE 7

AREA NO. 2.

SOUTH BELGRAVE

22 FEBRUARY, 1970.

	NUMBER OF PLANTS WITH SOME FLOWERS COVERED	NUMBER OF PLANTS WITH ALL FLOWERS UNCOVERED
Number of Plants with Seed	0	20
Number of Plants with no Seed	5	29

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Readers' Nature Notes

A Hardy Seaside Plant

Coast or Grey Salt-bush (*Atriplex cinerea*) has a wide distribution in coastal areas in all Australian states. It is a robust shrub about a metre high, with silvery-grey foliage, which is to be seen close to Melbourne at places such as Sandringham and Rickett's Point, where it grows strongly in clumps on the inland edge of the beach or even on the beach itself.

Young plants, a few centimetres high, can be seen growing actually in the beach sand, perhaps as much as five metres from the outer edge.

These seedlings appear to be thriving and it would seem that only abnormally rough seas prevent this plant from becoming established right on the beach only three or four metres from the edge of the sea.

As perhaps might be expected of such a hardy plant, cuttings are very easy to propagate and this plant has definite possibilities for seaside gardens where the light-coloured foliage would provide a definite contrast to the darker greens of so many other plants.

A.E.B.

NATURALISTS' IDENTIFICATION STICKER

The Latrobe Valley Field Naturalist Club has arranged for the production of an easily recognisable transfer for fixing to car windows. An illustration appears at right, and the Club's title may be added in the space at lower right.

These transfers will be available throughout Australia, so that any Naturalist travelling interstate will be readily recognised by fellow Naturalists.

The price of the transfer will be 30c. and the minimum number of 20 per order is required. The Club's name may be printed at no extra cost for orders of more than 100.

To aid the workability of the scheme, it is asked that Clubs (not individuals) apply for orders.

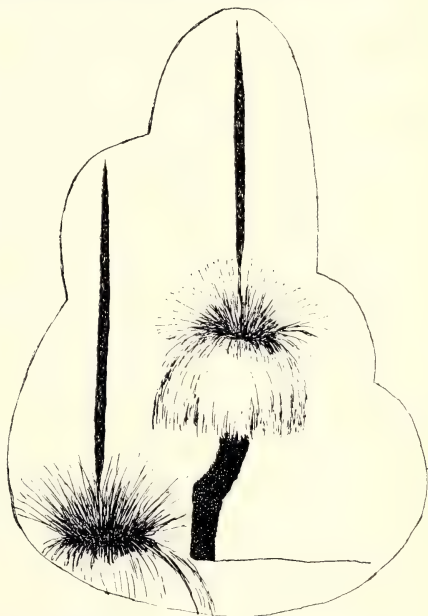
The address is:—

Mr. JOHN PUCKEY

Car Sticker Secretary

Latrobe Valley Field Naturalist Club

5 Brown Street, Trafalgar, Victoria, 3824



Field Naturalists Club of Victoria

General Meeting

11 February.

The prospect of another talk by Mr. Dan McInnes attracted a large audience to the February meeting. The subject, "Between High Tide and Low Tide", was another in the "Introductory Talks" series organized by Miss Madge Lester. The exhibits illustrating the talk created a great deal of interest. They included the sea slug *Dendrodoris nigra* displayed alive with its eggs and larvae, and also live *Galeolaria* under the microscopes. Mrs. Z. Lee had helped with the collection of exhibits. Also displayed were large sand worms (family *Arenicolidae*) collected at Waratah Bay by Mr. Dick Morrison, and a collection of fossil shells from the vicinity of Princetown and agates from Phillip Island shown by Mr. Ken Trotter. Mrs. Bishop spoke briefly about asbestos mining at Wittenoom, showing a piece of rock and a slide of the cliff face at Vampire Gorge.

Among the correspondence was a letter from the Victorian Conservation Trust appealing for donations to a fund established for the purpose of purchasing areas of ecological significance. Also appealing for financial support was a Queensland group hoping to purchase 300 acres of land for the preservation of aboriginal rock paintings in the Quinkan district.

Pending the re-opening of the library in a temporary area at the back of the hall stocktaking is being done, and any members still holding books are requested to return them as soon as possible. The Club is also still appealing for storage space for trestle tables and boxes of printing blocks. Council would be pleased to hear from anyone able to assist.

The President spoke briefly about the inability of Council to deal adequately with the many conservation issues which are brought to the notice of the Club. He announced that he would shortly be calling a meeting to discuss this, and he hoped that it would lead eventually to the formation of a Club Conservation Group to operate on similar lines to other Club groups.

The next meeting will be the Annual Meeting and will be held on Wednesday, 13 March, not on the usual Monday because of the Public Holiday on that day. Following the election of officers

and Council the Presidential address will be given. It is anticipated that Mr. Kelly will devote the major part of his talk to some aspect of his special interest, entomology.

Botany Group

14 February.

Botany Group opened the year with a well-attended Members' Night; it was a particular pleasure to welcome several new members who have recently joined the Club.

Miss Madge Lester gave a talk on the liverwort, *Marchantia*, illustrated with slides and some beautiful living material in fruit. Mr. Tom Sault spoke about Wingan Inlet and also showed a few slides of the Green's Bush area on Mornington Peninsula. Mrs. Margaret Corrick spoke about the *Rutaceae* family incorporating the "Flower of the Month", *Crowea exalata*. Mr. Alan Morrison showed slides of some of the lilies of the Northern Territory. There were a number of exhibits illustrating the talks and these stimulated a good deal of discussion after the meeting.

The Secretary presented the annual report of the Group, and following discussion of this it was agreed to organize a special beginners' excursion during the year. Mrs. Webb-Ware also offered to help anyone who wanted to learn elementary botany, and suggested they contact her if interested. The group will continue with a monthly beginners' segment, mostly in the form of the "Flower of the Month".

An excursion sub-committee was elected and will prepare a programme to be submitted at the March group meeting. The first excursion for the year was on Sunday, 3 March, to the site of the proposed Yarra Brae dam. Leaders were members of the Yarra Brae Action Committee.

Annual Report for 1973.

Attendances at Botany Group meetings were consistent throughout the year and at about the same level as in 1972. Eleven meetings were held; apart from the usual February Members' night we had a speaker at every meeting. Seven excursions were arranged during the year and in addition a small group made two trips to Diamond Valley to assist a local group with a plant survey. We were also pleased to be able to help with a plant

survey in two small areas on the east side of the Macedon Range.

Attendances at regular excursions varied considerably, the most popular being the Kinglake fungus trip in May and Rushworth Forest in September.

An effort was made to improve the excursion reports; plant lists and pressed specimens of some of the interesting and unusual plants were displayed at subsequent meetings. It has been suggested that these could form the beginning of a group herbarium, which would be a useful adjunct to our activities, but storage space at present is a problem.

A new feature started during the year was "The Flower of the Month", featuring either one species or a genus. Living or pressed specimens were displayed, a sheet of notes was available and on several occasions the club microscopes were used to demonstrate the small parts of the flower. This series was designed particularly to help beginners to identify native plants, but proved popular with most group members.

We look forward to another active year and extend an invitation to anyone interested in botany and native plants to join us at meetings or on outings.

Mammal Survey Group

November and December Camps

On the 17, 18 November, 1973 the Group surveyed dry stringybark woodland in undulating country, approxi-

mately 2 km east of Heathcote. The number of mammals seen was low, and a total of four native species were recorded for the camp. These were Black Wallaby (*Wallabia bicolor*), Grey Kangaroo (*Macropus giganteus*), Brush-tail Possum (*Trichosurus vulpecula*) and Echidna (*Tachyglossus aculeatus*). Trapping results were nil for the camp.

On the 9, 10 December the Group surveyed several areas of bush near Arthur's Seat, on the Mornington Peninsula, and although the attendance was the smallest at any camp for the year, it was nevertheless quite successful. A total of seven native species were recorded for the weekend. Species captured by live-trapping were Swamp Rat (*Rattus lutreolus*) and Brown Antechinus (*Antechinus stuartii*). Species recorded by spotlighting were Ringtail Possum (*Pseudocheirus peregrinus*), Brushtail Possum (*Trichosurus vulpecula*) and Sugar Glider (*Petaurus breviceps*). Daylight sightings were made of Echidna (*Tachyglossus aculeatus*), Black Wallaby (*Wallabia bicolor*) and also one introduced species, Fox (*Vulpes vulpes*).

February Meeting

The meeting on the 7 February had a large attendance with several new members. Matters discussed included recent camps and reports, future camps, and slides and films of the Group's activities.

AUDITORS' REPORT TO THE MEMBERS OF THE FIELD NATURALISTS CLUB OF VICTORIA

In our opinion:

- (a) the attached balance sheet and profit and loss account are properly drawn up in accordance with the provisions of the Companies Act 1961 of Victoria as amended and so as to give a true and fair view of:
 - (i) the state of affairs of the Club at 31 December, 1973 and of the results of the Club for the year ended on that date; and
 - (ii) the other matters required by Section 162 of that Act to be dealt with in the accounts:
- (b) the accounting records and other records, and the registers required by that Act to be kept by the Club have been properly kept in accordance with the provisions of that Act.

DANBY BLAND & CO.,
Chartered Accountants.
R. M. BLAND, Partner.

Melbourne, 27 February, 1974.

REPORT BY EXECUTIVE COUNCIL

The members of the Executive Council submit herewith balance sheet as at 31 December, 1973 and income and expenditure account for the year ended on that date, and report as follows —

1. The Net Deficit of the Club for the year ended 31 December, 1973 was \$4 which, deducted from the Surplus brought forward at 1 January, 1973 of \$8,290, together with a transfer of \$380 from Club Improvement Account, results in a surplus to be carried forward to next year amounting to \$8,666.
2. The members of the Executive Council took reasonable steps to ascertain before the profit and loss account and balance sheet were made out, that all known bad debts were written off and adequate provision was made for doubtful debts.
3. The members of the Executive Council took reasonable steps, before the profit and loss account and balance sheet were made out, to ascertain that the current assets, other than debtors, were shown in the accounting records of the company at a value equal to or below the value that would be expected to be realised in the ordinary course of business.
4. At the date of this report, the members of the Executive Council are not aware of any circumstances which would render the values attributable to the current assets in the accounts misleading.
5. No charge on the assets has arisen, since the end of the financial year to the date of this report, to secure the liabilities of another person. No contingent liability has arisen since the end of the financial year to the date of this report.
6. No contingent or other liability has become enforceable or is likely to become enforceable within the period of twelve months after the end of the financial year which in the opinion of the members of the Executive Council will or may affect the ability of the club to meet its obligations as and when they fall due.
7. At the date of this report the members of the Executive Council are not aware of any circumstances not otherwise dealt with in the report or accounts which would render any amount stated in the accounts misleading.
8. The results of the club's operations during the financial year, in the opinion of the members of the Executive Council, were not affected by any item transaction or event of a material and unusual nature.
9. Since 31 December, 1973, and to the date of this report, in the opinion of the members of the Executive Council, no item transaction or event of a material and unusual nature, which would affect substantially the results of the Club's operations for the next succeeding financial year, has occurred.
10. No member of the Executive Council, since the end of the previous financial year, has received or become entitled to receive a benefit by reason of a contract made by the club with the member or with a firm of which he is a member or with a company in which he has a substantial financial interest.
10. The principal activities and objects of the Club are to stimulate interest in natural history and to preserve and protect Australian Fauna and Flora. No significant change in the nature of those activities occurred during that period.
11. The names of the members of the Executive Council in office at the date of this report are as follows —
 - Mr. P. G. Kelly
 - Mr. T. Sault
 - Mr. J. H. Willis
 - Mr. L. Winsor
 - Mr. R. H. Riordan
 - Mrs. M. Corrick
 - Mr. H. Bishop
 - Mr. I. Cameron
 - Mr. G. Ward
 - Mr. G. Douglas
 - Mr. J. Martindale
 - Miss G. Piper
 - Miss M. Allender
 - Mr. M. Coulthard
 - Dr. B. Smith
 - Mr. R. Gibson

This report is made in accordance with a resolution of the Executive Council dated 26 day of February, 1974.

H. BISHOP
R. H. RIORDAN

GENERAL ACCOUNT

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDED 31 DECEMBER, 1973

Year	Receipts		Payments	
1972			"Victorian Naturalist"—	
	Subscriptions Received—		Printing	\$5,020
\$81	Arrears \$97		Illustrating	1,006
5,867	Current 6,015		Despatching	577
166	Supporting 164		Editorial	15
				<hr/>
\$6,114	Sales of "Victorian Naturalist"	\$6,276	Less Grants—	\$6,618
255	Advertising in "Victorian Naturalist"	275	Ingram Trust—	
108	Interest Received—	50	on hand	(100)
	Library Fund \$5		applied for	(770)
	Bank Account 122		Treasury	(500)
	Commonwealth Bonds 152			<hr/>
	Bonds — M. Wright Legacy .. 395			\$4,963
	Bonds — C. M. Walker Legacy .. 85			
592	Premiums on redemption of Commonwealth Bonds Series "U"	759	Working Expenses—	
—	Sundry Income 72		Postage and Telephone	\$183
22	Deficit for year 33		Printing and Stationery	135
—			Rent of Room for Storage	40
			General Expenses	264
			Affiliation Fees, Subscriptions and Donations	83
			Preston Junior Club Rent	16
			Natural History Medallion Expenses	98
			Typing and Clerical Assistance	1,027
			Auditors' Remuneration	50
			Rent of Hall, Library and Museum Room	349
			Rent of Office Space	195
			Insurance	66
				<hr/>
\$7,091		\$7,469		2,506
			Mammal Survey Group Expenses	\$318
			Less Ingram Trust Grant	(318)
			Surplus for Year	—
				<hr/>
				\$7,469

Notes 1. Auditors' Remuneration, \$50, relates to Auditing services only. No other benefits were received by the Auditors in respect of their services to the Club.

2. No Emoluments were paid by the Club to any member of the Executive Council.

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2. No Emoluments were paid by the Club to any member of the Executive Council.

FIELD NATURALISTS CLUB OF VICTORIA

BALANCE SHEET AT 31 DECEMBER, 1973

Year	Liabilities	Assets	Year
1972			1972
	Current Liabilities—	Currents Assets—	
\$583	Subscriptions paid in advance ..	Cash at Bank	\$2,646
—	Sundry Creditors	Commonwealth Bonds at cost ..	2,000
	Treasury Grant — Victorian	Sundry Debtors	717
500	<i>Naturalist</i> — in hand	Stocks on hand at cost—	
	M. A. Ingram Trust Grant, in	Badges	26
4	hand	Microscope Project	58
		Books for Sale	521
		Flower Books	424
			\$6,392
		Fixed Assets at cost—	
		Library Furniture and	
		Equipment	\$6,361
		Less written off	300
			\$6,061
		Land — Cosstick Reserve, Mary-	
		borough	141
			\$6,202
\$1,087	\$2,121		

Special Funds and Accounts—			
Building Fund	3,273		\$3,462
Publication Fund	6,036		6,480
Library Fund	100		100
Club Improvement Account	573		124
Excursion Account	200		200
Estate M. Wright Legacy	5,217		5,217
P. E. Morris Gift Account	—		300
Estate Miss I. F. Knox Legacy	200		200
Estate C. M. Walker Legacy	1,000		1,450
Estate R. S. Chisholm	20		20
Wilfred C. Woollard Fund	551		597
D. E. McInnes Fund	—		519
Microscope Project A/c.	613		123
Flower Book Account	2,666		3,192
Trailer Account	13		13
N. A. Wakefield Memorial Fund	—		52
	<u>\$20,462</u>		<u>\$22,049</u>
Surplus of Assets over Liabilities—			
Balance at 1/1/73		\$8,290	
Transfer from Club Improvement Account		380	
Deficit for year		(4)	
	<u>\$8,290</u>		<u>\$8,666</u>
Investment of Funds—			
Library Fund—			
Commonwealth Bonds, at cost	\$100		\$100
Legacy Estate M. Wright—			
Commonwealth Bonds, at cost	5,200		5,200
Legacy C. M. Walker—			
Commonwealth Bonds, at cost	1,000		1,000
Wilfred C. Woollard Fund—			
M.M.B.W. Debenture, at cost	500		500
Flower Book Account—			
Commonwealth Bonds, at cost	2,450		3,000
D. E. McInnes Fund—			
Esanda Ltd. Debenture, at cost	—		500
	<u>\$9,250</u>		<u>10,300</u>
Building Fund—			
Commonwealth Bonds, at cost	\$2,100		\$2,100
S.E.C. Inscribed Stock, at cost . .	1,000		1,000
Cash at Bank	173		362
	<u>\$3,273</u>		<u>3,462</u>
Publications Fund—			
Commonwealth Bonds, at cost	\$1,800		\$3,800
Book Stocks, at cost—			
Birds of the Dandenongs	—		738
Victorian Toadstools	468		258
Wyperfeld National Park	251		137
Wilson's Promontory National Park	136		80
Sundry Debtors	1,311		761
Cash at Bank	2,070		706
	<u>\$6036</u>		<u>6,480</u>
	<u>\$29,839</u>		<u>\$32,836</u>

FIELD NATURALISTS CLUB OF VICTORIA

BUILDING FUND

Amount of Fund at 31 December, 1972	\$3,273
Interest on Investment and Bank Account	183
Premium on redemption of Commonwealth Bonds	6
Amount of Fund at 31 December, 1973	<u>\$3,462</u>

PUBLICATIONS FUND

Amount of Fund at 31 December, 1972	\$6,036
Interest on Investment and Bank Account	167
Premium on redemption of Commonwealth Bonds	28
Surplus for the year from —	
Victorian Toadstools and Mushrooms	\$67
Vegetation of Wyperfeld National Park	87
Wild Flowers of Wilson's Promontory National Park	25
Birds of the Dandenongs	<u>70</u>
	249
Amount of Fund at 31 December, 1973	<u>\$6,480</u>

CLUB IMPROVEMENT ACCOUNT

Amount of Account at 31 December, 1972	\$573
Sale of Old Library Books	24
Book Sales Account Profit	47
Share of Profit from Nature Shows —	
1972	\$100
1973	<u>60</u>
	160
	<u>\$804</u>
Less —	
Amount written off Books and Equipment Account	\$300
Purchase of Library Books, Furniture and Equipment, transferred to Surplus Account	<u>380</u>
	680
Amount of Fund at 31 December, 1973	<u>\$124</u>

STATEMENT BY MEMBERS OF THE EXECUTIVE COUNCIL

In the opinion of the members of the Executive Council of The Field Naturalists Club of Victoria, the accompanying Balance Sheet is drawn up so as to give a true and fair view of the state of affairs of the Club as at 31 December, 1973, and the accompanying Statement of Income and Expenditure is drawn up so as to give a true and fair view of the deficit of the Club for the year ended 31 December, 1973.

Signed in accordance with a resolution of the Executive Council on 26 February, 1974.

P. G. KELLY, President.

H. BISHOP, Treasurer.

STATEMENT BY THE PRINCIPAL ACCOUNTING OFFICER

I, DANIEL E. McINNES, being the officer in charge of the preparation of the accompanying accounts of The Field Naturalists Club of Victoria for the year ended 31 December, 1973 state that, to the best of my knowledge and belief, such accounts give a true and fair view of the matters required by Section 162 of the Companies Act 1961, to be dealt with in the accounts.

Signed at Melbourne on the 26 day of February, 1974.



**1972...
2000...
2100...
2200...**

**For today... and the
centuries ahead**

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FORESTS COMMISSION, VICTORIA



Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

Key Office-Bearers, 1973-1974.

President:

Mr. P. KELLY

Hon. Secretary: Mr. R. H. RIORDAN, 15 Regent St., East Brighton, 3187. 92 8579

Treasurer: H. BISHOP. Address Correspondence to National Herbarium, The Domain, South Yarra.

Subscription Secretary: Mr. D. E. McINNES, 129 Waverley Rd., East Malvern, 3145.

Hon. Editor: Mr. G. M. WARD, 54 St. James Road, Heidelberg 3084.

Hon. Librarian: Mr. J. MARTINDALE, c/o National Herbarium, The Domain, South Yarra.

Hon. Excursion Secretary: Miss M. ALLENDER, 19 Hawthorn Avenue, Caulfield 3161. (52 2749.)

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Group Secretaries

Botany: Mrs. M. G. CORRICK, 7 Glenluss St., Balwyn 3103. Tel. 857 9937.

Day Group: Mrs. J. STRONG, 1160 Dandenong Rd., Murrumbeena (56 2271).

Entomology and Marine Biology: Mr. J. W. H. STRONG, Flat 11, "Palm Court", 1160 Dandenong Rd., Murrumbeena 3163 (56 2271).

Field Survey: Miss L. BARRACLOUGH, 4-7 Chrystobel, Cres., Hawthorn, 3122

Geology: Mr. T. SAULT.

Mammal Survey: Mr. D. KELLY, c/o 14 Finnigan's Road, Research, 3095.

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Rates of Subscriptions for 1973.

Ordinary Members	\$7.00
Country Members	\$5.00
Joint Members	\$2.00
Junior Members (under 18 years)	\$2.00
Junior Members receiving Vict. Nat.	\$4.00
Subscribers to Vict. Nat. (Aust. only)	\$5.00
Overseas Subscribers	\$6.00
Affiliated Societies	\$7.00
Supporting Members	\$10.00
Life Membership (reducing after 20 years)	\$140.00

The cost of individual copies of the Vict. Nat. will be 45 cents (52 cents — overseas requests).

Full-time Students between 18 and 21 years pay at Junior Member rates.

All subscriptions should be made payable to the Field Naturalists Club of Victoria, and posted to the Subscription Secretary.

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APRIL, 1974

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FIELD NATURALISTS CLUB OF VICTORIA

in which is incorporated the Microscopical Society of Victoria

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 8 April — At National Herbarium, The Domain, South Yarra, commencing at 8 p.m.

Speaker — Mr. Geoff Douglas (Vermin and Noxious Weeds Department).

New Members —

Ordinary:

Mr. Rod Elphinstone, Flat 1A, 149 Lower Heidelberg Rd., East Ivanhoe, 3079. *Field Survey*.

Mr. Gordon Friend, Dept. of Zoology, University of Melbourne, Parkville, 3052. *Mammal Survey*.

Mrs. Dorothy J. Fraser, Flat 9, 149 Lower Heidelberg Rd., East Ivanhoe, 3079. *Mammal Survey*.

Mrs. Jean Hughes, 8 Livingstone St., Ivanhoe, 3079. *Geology and Botany*.

Mr. Nigel McGillivray, 6 Eblana Ave., Mentone, 3194. *Botany*.

Miss Rhyllis J. Plant, C/o Invertebrate Dept., National Museum, Russell St., Melbourne, 3000. *Mammal Survey*.

Mr. Graeme Smith, 60 Morey Rd., Beaumaris, 3193.

Mr. Graeme J. Foster, 9/10 Khartoum St., Caulfield, 3714. *Mammals and Birds*.

Joint:

Mr. A. Rust and E. Rust, 8 Douglas St., Hastings, 3195. *Mammal Survey*.

Mr. R. Ferguson and Miss J. Lackman, "Allwood", 901 Main Rd., Hurstbridge, 3099. *Mammal Survey*.

Junior:

Michael B. O'Connor, 13 Graham St., Surrey Hills, 3127. *Marine and Entomology*.

Monday, May 13 — Speaker Arthur Brookes. Subject "A Year in the Life of a Frog".

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Wednesday, 10 April — Conservation Group. Speakers Mr. Ross Garnet on the Club's history in conservation, and Mr. Graham Douglas, on tasks needing to be done in conservation.

Thursday, 11 April — Botany Group. April meeting cancelled because of Easter break.

Wednesday, 17 April — Microscopical Group Meeting.

Thursday, 18 April — Day Group. Visit to "Ripponlea". Meet at Hotham Street entrance, Elsternwick, at 11.30 a.m. Bring lunch. Admission to grounds and garden 50c (pensioners 10c). Admission to House 30c (Pensioners 10c).

Thursday, 25 April — F.S.G. Meeting in Conference Room, National Museum at 8.00 p.m. **Camp** — 12-16 April.

Monday, 6 May — Marine Biology and Entomology Group meeting in Conference Room, National Musuem at 8.00 p.m.

Wednesday, 1 May — Geology Group.

Thursday, 2 May — M.S.G. Meeting at Arthur Rylah Institute, 123 Brown Street, Heidelberg at 8.00 p.m.

F.N.C.V. EXCURSIONS

Sunday, 21 April — Lerderderg Gorge. Leader Mr. J. Myers. The bus will leave Batman Avenue at 9.30 a.m. and a stop will be made at Lake Merrinal where the leader will meet the party. Fare \$2.00. Bring one meal and a snack.

Sunday, 1 September to Sunday, 8 September — Kangaroo Island. This excursion will start from Adelaide and includes motel accommodation on the Island on D. B and B basis, day excursions and air travel between Adelaide and Kangaroo Island at a cost of approximately \$135. A group booking on the train leaving Saturday evening can be arranged for those desiring it and a concession rate will apply if sufficient members travel at this time. To obtain the concession it is necessary to travel together on the forward journey but those wishing to extend the holiday may return at a later date. A deposit of \$25.00 should be paid to the excursion secretary (cheques to be made out to "Excursion Trust"). Please check if there are vacancies before sending any money.

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Front Cover:

Leggodina forresti, Fowlers Gap Station,
New South Wales.

The committee set up to establish a Conservation Group within the club has met, and appointed an interim chairman and secretary. They are Mr. Barry Callanan, chairman, and Miss Gwen Piper, secretary. The committee decided the first meeting of the group will be held on Wednesday, 10 April. Three speakers will give the meeting an outline of the reasons for setting up the group, a brief history of the club's past activity in conservation, and a list of projects the group could carry out. Those attending will then be asked to decide which tasks they consider it would be possible for them to undertake.

The third Fire Ecology Seminar at Monash University was held on 23 March. It was opened by the Victorian Minister of Forests, the Hon. F. J. Granter, M.L.C. Thirteen speakers presented papers—three were from the Forest Commission of Victoria, two from Forests Department of W.A., four from C.S.I.R.O., and one each from the Australian Museum, Land Conservation Council, R.M.I.T., and Melbourne University. Professor J. S. Turner gave the first talk, entitled: "Fire and Conservation, Compatibility or Conflict." Other papers covered the role of fire in park, wilderness, and forest management, its effects on mammals, litter, fauna, and birds, plus the properties and nature of smoke from forest fires. Attendance was three to four hundred, which shows how interest in this subject has grown since the first seminar in 1969, when only 78 were present. As usual, F.N.C.V. was well represented. The Country Fire Authority was, however, mainly conspicuous by its absence this year, though a few volunteer rural fire brigade officers were there.

The absence of C.F.A. from the seminar may, perhaps, be linked with the fact that they have shown little concern for the environmental effects of their fire prevention work, which has caused considerable concern to conservationists. It is of interest in this regard to note that Conservation Council of Victoria has just adopted a policy statement on Conservation and Fire Prevention. It will be published in full later.

First Record of Forrest's Mouse

Leggadina forresti (Thomas, 1906) in N.S.W.

by

S. R. MORTON*

Introduction

Leggadina forresti (Thomas, 1906) is a small native rodent whose biology and distribution are poorly known. The species is found in arid regions of Western Australia, South Australia, Queensland and the Northern Terri-

tory (Ride, 1970), but has not been previously recorded from New South Wales. It is therefore of interest to report the discovery of this species in western New South Wales.

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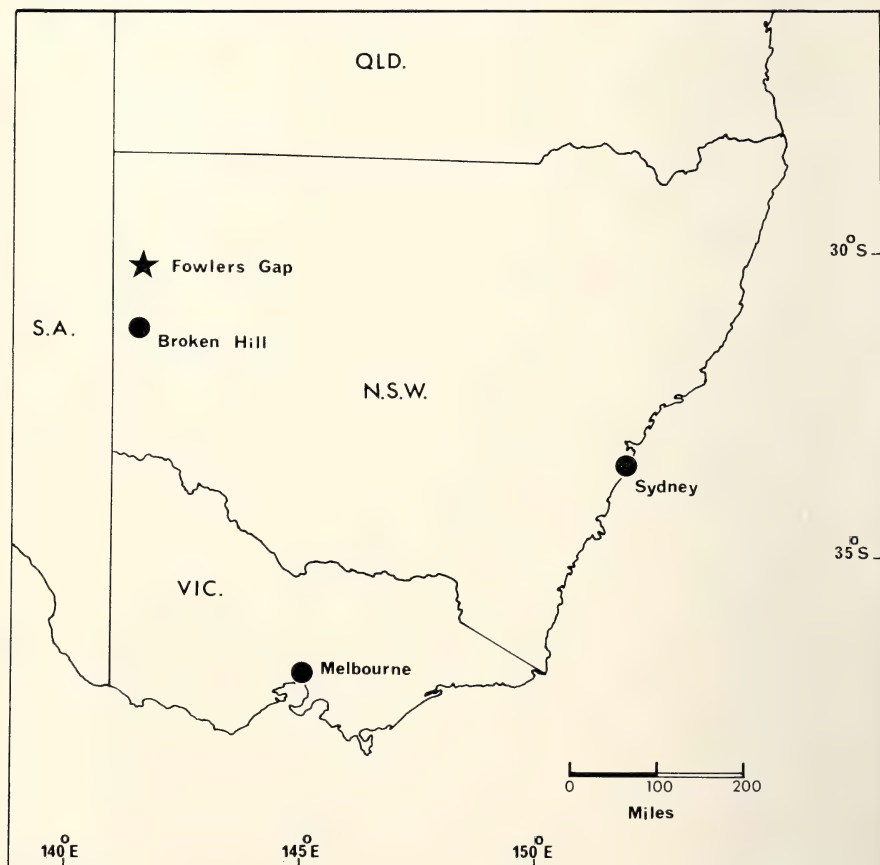


Figure 1. Map showing the location of Fowlers Gap Station.

Discovery

The first specimen, an adult male, was captured at 00.05 hrs. (Central Standard Time) on 5 May, 1973 at the Fowlers Gap Arid Zone Research Station of the University of New South Wales, 110 km north of Broken Hill (see Figure 1). It was seen while spotlighting and captured by hand. This animal died after two days in captivity, and was forwarded to Miss J. M. Dixon of the National Museum of Victoria for identification, and thence to Mr. J. A. Mahoney of the University of Sydney for confirmation. It is now lodged in the National Museum of Victoria as a skull and a body in spirit, catalogue number C11331.

The second specimen, a juvenile female (Plate 1), was hand-captured at sunrise (05.25 hrs.) on 4 October, 1973 approximately 1 km north of the first site. On capture this animal weighed 10 g, and after 1 month in captivity had grown to 15 g.

The area where the captures were made is situated in a zone of approximately 20 cm average annual rainfall. It is a flat, red, treeless plain adjacent

to the rocky slopes of the Barrier Range (Plate 2). The first capture site is in the Conservation Land System and the second in the Gap Hills Land System, according to the classification of Corbett *et al* (1972). Fowlers Creek runs between the two sites.

The vegetation is an *Atriplex vesicaria* (bladder saltbush) community which has been degraded by sheep grazing, resulting in invasion by *Bassia* spp. (poverty bush and copper burr) (Milthorpe, 1972). Patches of *Kochia pyramidata* (black bluebush) are present, and a large number of other saltbushes and grasses grow within the community. At the time of the discovery of the specimens there was considerable plant growth following consistent rains throughout the year.

Nomenclature

Leggadina forresti (Thomas, 1906) has been assigned to the genus *Pseudomys* (Gray, 1832 by Ride, 1970). However Mahoney (pers. comm.) believes *Leggadina* (Thomas, 1910) to be generically distinct from



Plate 2. *Atriplex* plains on Fowlers Gap Station, with rocky slopes in the background.

Pseudomys, with *L. forresti* being the type species.

Leggadina messoria (Thomas, 1925), *Leggadina waitei* (Troughton, 1932), and *Gyomys berneyi* (Troughton, 1936) are all synonyms of *Leggadina forresti* (Ride, 1970; Mahoney, pers. comm.).

Discussion

Leggadina forresti is easily recognised by its small size and by the length of its tail, which is shorter than the head and body. The specimens captured at Fowlers Gap are a sandy grey above and white below.

During the capture of the first specimen an attempt was made to hold it by the tail. However the distal third of the tail sheath slipped away, leaving the vertebrae behind. The naked vertebrae dried and dropped off during the next day. The ease with which the tail sheath came away suggests that this may be an adaptive mechanism enhancing escape from predators, as postulated for some species of North American rodents by Layne (1972).

Both specimens were captured on flat plain dominated by *Atriplex* and *Bassia*. This habitat may be similar to the grassy plain from which the species has been reported in the Northern Territory (Parker, 1973). It appears that the animals shelter in cracks in the soil as does the fat-tailed marsupial mouse, *Sminthopsis crassicaudata*.

The terrestrial vertebrate fauna of Fowlers Gap has been listed by Dawson and Russell (1973). The only small mammals recorded from the saltbush plains were *Sminthopsis crassicaudata* and the introduced mouse, *Mus musculus*. In my experience the former species is common, whereas I have collected only one house mouse.

In view of the general pattern of

distribution of *Leggadina forresti* its presence in western New South Wales is not unexpected, and it is surprising that it has gone undetected for so long.

Acknowledgements

I am indebted to the Fowlers Gap Management Committee for allowing me to work on the Station and make use of its facilities. Mr. Ian Auldist helped capture the first specimen.

A grant from the M. A. Ingram Trust covered travelling expenses.

Miss J. M. Dixon of the National Museum of Victoria identified the first specimen and arranged for its confirmation. I am grateful to Mr. J. A. Mahoney of the University of Sydney for his advice and information.

Dr. A. A. Martin read and criticised the manuscript.

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Macropus Rufus Fossil Find in Western Victoria

by H. E. WILKINSON

Introduction

There does not appear to have been any published record of the occurrence of the Red Kangaroo, *Macropus (Osphranter) rufus* as an endemic species in Southern Victoria, nor has there been any record of its presence as a fossil. Thus the discovery of a nearly complete fossil skeleton of this kangaroo at Lake Gnarpurt is of considerable interest. *Coxiella* shells associated with the skeleton gave a radiocarbon date of 4550 ± 120 yrs B.P., and although this is geologically very young, it is significant that it falls within that part of the Holocene period referred to as the Post Glacial Thermal Maximum. The specimen found at Lake Gnarpurt provides the

first evidence that this arid country kangaroo extended its range into Southern Victoria during this time.

Discovery of the skeleton

Dr. P. S. Lang of Lismore, Victoria, has been interested in the fossil marsupials of the Western District for a long time, and in 1968 began a systematic search of the area for new localities, as well as recollecting from known ones. The result has been many new localities, and a large collection of fossil bones from the Colac-Camperdown area, which has been donated to the National Museum of Victoria.

In September, 1968, Dr. Lang and Mr. H. Stephens were searching for localities in the Lake Gnarpurt area,

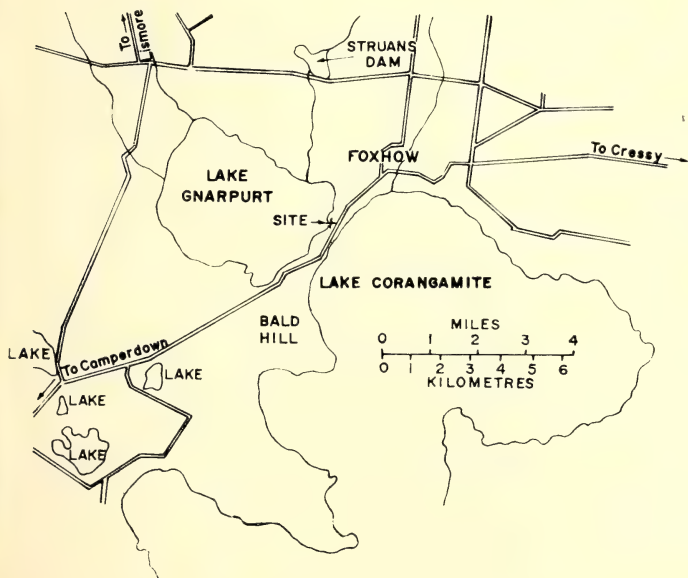


Fig. 1

Locality plan
showing the
fossil Red
Kangaroo site.

and found bones protruding from the bank of the channel connecting Lake Gnarpurt and Lake Corangamite. They were in a sticky grey clay just above water level, and, fearing a further rise above the already high level, collected as much as they could. Dr. Lang took notes, and a sketch of the occurrence. At the time, I was Assistant Curator of Fossils at the National Museum, and Dr. Lang contacted me to inform me of the find. The following week, R. J. Paton and myself met Dr. Lang at the site, and excavated the remainder of the skeleton. A concentrate of *Coxiella* shells which occurred in abundance in the matrix of the skeleton was obtained by careful sieving. This yielded a small rodent jaw, probably *Rattus lutreolus*, and a few small bones from the kangaroo skeleton.

Identity of the skeleton

The skeleton must have originally been very nearly complete when buried, but the excavation work which revealed it appears to have removed the left scapula and humerus, and most of the tail. All other major limb bone elements are present, and most are complete. The skull has suffered

damage to the rostral region, but the molar dentition is complete. The mandible was not found. The material collected was registered as NMV P28818, and is listed below:

Skull, right scapula, clavicle and humerus; radius and ulna (all complete); sternum and four sternal vertebrae; pelvis (damaged, but both halves present); femur and tibia (all complete); left fibula (complete), right fibula (damaged); calcaneum, astragalus, metatarsal IV and V, several phalanges, including one terminal phalanx; numerous ribs and rib fragments; 16 cervical vertebrae, including the axis and atlas; 15 lumbar vertebrae, the sacrum, and six of the large, proximal caudal vertebrae.

The above is a brief outline of the bones preserved, which appear to be those of an adult animal. When the first bones sent by Dr. Lang were compared to those of living kangaroos, it was with the preconceived idea that they would prove to be those of the Grey Kangaroo (*Macropus giganteus*). However, it was soon apparent that the bones did not belong to that species, and comparisons were extended further. This revealed that

Plate 1

Skull of fossil *Macropus* (*Osphranter*) *rufus* from Lake Gnarpurt (NMV P 28,818). Ventral (Palatal) view.

approx. $\frac{1}{2}$ nat. size



they were in fact *Macropus (Osphranter) rufus*, an identification which was confirmed when the skull was found in the subsequent excavation.

Description of the site

The bones were found just above the September 1968 water level in the north bank of the S.R. & W.S.C. channel which connects Lake Gnarpurt and Lake Corangamite for flood control purposes. This channel is cut through the natural causeway which separates the two lakes. The bones were at approximately the same level as the invert of the culvert which takes the water under the road along the causeway, approximately 4 metres below the road, and about 38 metres W. of the road fence. Currey (1964) gives the highest natural level of the lunette which forms the causeway as RL 394 (119 m) but the road is built up above this. The *Coxiella* shell bed at RL 387 (117 m) which he refers to as occurring below the lunette is probably the shell bed with which the skeleton was associated.

Geology

The area is underlain by Tertiary marine sediments of the Heytesbury Group, believed to be equivalent, in part at least, to the Port Campbell Limestone. Hard, metasomatised limestones with poorly preserved marine molluscs outcrop around Struans Dam, north of Lake Gnarpurt, and Dr. Lang has collected fragments of fossil oysters washed up on the south shore of the lake. These beds are probably Miocene in age, and were succeeded by the non-marine Moorabool Viaduct Sands, following regression of the sea. However, much of the area is covered by the later Newer Volcanic rocks, and the "Colac" 1:250,000 geological map distinguishes an older and younger suite of these. The volcanic activity modified the pre-existing drainage pattern, and the lake system we see today began to form. Currey (1964) provided a reconstruction of the sequence of events leading to the formation of a very large lake, and its subsequent

Plate 2

Skull of fossil *Macropus (Osphranter) rufus* from Lake Gnarpurt (NMV P 28,818). Dorsal view (Note *Coxiella* shells in matrix of rostral area).

approx. $\frac{1}{2}$ nat. size
(Photography by
Mr. F. Guy,
R.M.I.T.)



contraction to the present lakes and their associated landforms. Lunette formation has modified the lakes, and resulted in a complex Quaternary history. For further information on this aspect, see Gill 1953 and references quoted therein.

The causeway between Lakes Gnarpurt and Corangamite is a low lunette which formed at a time of low lake levels. It is being eroded at the present time, and has probably had a complex history due to cyclic oscillations of lake levels. The south end of the causeway merges with the high parna dune known as Bald Hill.

The material containing the skeleton is lacustrine clay, redeposited by wind action, along with *Coxiella* shells blown up from the lake bed. An auger hole at the skeleton site penetrated a further eight feet of similar material, in which *Coxiella* was much more sparsely distributed and carbonate nodules were common. The bones were only lightly mineralised, and appeared to be younger than the typically heavily mineralised Colongulac Fauna fossil marsupials. Bones with similar lightly mineralised preservation were found at the east end of the channel, and also along the east shore of Lake Gnarpurt, where the lunette is being actively eroded. The bones were mostly macropodid, and included a jaw of *Wallabia*. It is interesting to note that bones of domestic animals which occur here are also somewhat mineralised.

The *Coxiella* sample obtained from around the skeleton was radiocarbon dated at Kogyoshin University, Japan, and gave a radiocarbon age of 4,550 \pm 120 yrs. B.P. (GaK—2518) (No. 36, p.74, Gill, 1971). This confirmed the expectation that the occurrence would prove to be substantially younger than the Colongulac Fauna, which is more than 20,000 years old. The date obtained strongly suggests

that the present causeway is of geologically recent origin, dating back to the Post Glacial Thermal Maximum.

Present status of *Macropus (Osphranter) rufus* in Victoria

Kreff (1866) stated that this species was already scarce on the Victorian side of the Murray River, even at this early date in the history of European settlement, although Brazenor (1950) says that it formerly occurred in Victoria in "some numbers", Wakefield (1966a) in his paper on the Blandowski Expedition of 1956-7 quotes an extract from Kreff's diary showing that none were brought in by the natives to the camp at Gunbower, and that the range eastward did not extend much beyond Mt. Hope. Wakefield (1966b) was able to quote only two modern Victorian records, and these were Benetook 1949 and Neds Corner 1960.

Frith and Calaby (1969) do not refer specifically to Victorian records, but state (p. 27) that the species has a "more or less continuous range in the drier parts of all mainland states outside the forest and woodland area". On p. 42 they state that "Red Kangaroos are very uncommon in deserts, avoid dense scrubs and stony or rocky ranges, and are most numerous in lightly wooded plains". This last would probably describe well the likely ecology of the Lake Gnarpurt area during the warmer period of the Post Glacial Thermal Maximum, when the somewhat higher temperatures, and probably lower rainfall, would have produced an environment not unlike that favoured by these kangaroos at the present time.

Conclusion

A reasonable expectation that *Macropus (Osphranter) rufus* might have extended into Southern Victoria during the Post Glacial Thermal Maximum has been confirmed, and it can

The Filmy Maidenhair

Naturalists who specialise in the ferns may be interested to hear of two fairly recent discoveries in the Gippsland hills of the Filmy Maidenhair, *Adiantum diaphanum*.

This small fern was recorded for the first time in Victoria back in 1880, on one of the headwater creeks of the Lang Lang River, and was not noted again, so far as we know, until members of the Warragul Field Naturalists Club came across it in the spring of 1972 in a deep gully in the Allambee area. The fern fronds are short, broad and dark (not in the least "diaphanous"), rising from long wiry rhizomes that straggle round the foot of a steep wet rockface of sandstone. It was an exciting find for the local fern lovers who are constantly rummaging round in the last of the natural fern gullies that the pioneers and the pine farmers have left to us.

On 2 April, 1973, the little Maidenhair turned up again, quite unexpectedly, near Korumburra. Again,

here was a dripping rockface above a creek, below a steep cleared hillside well grazed and tramped by sheep and cattle these many years. Remnants of a rich gully flora struggle among the steps and stairs of the exposed rocks and a few fine Mountain Ash and Swamp Gum still grace the paddock. The survival of this small colony in the scant shelter of a crevice seems a minor miracle.

As the crow flies, neither of these two sites is very distant from the heads of the Lang Lang River, which takes a wide sweep inland before turning for Western Port. It is possible that other colonies of the Filmy Maidenhair await discovery in some of the hundreds of gullies and gorges of this rough terrain. *A. diaphanum* is rare only in Victoria. It extends northwards through the other eastern States and far beyond. It is also found in New Zealand.

ELLEN LYNDON,
Leongatha.

Macropus Rufus Fossil

(continued)

be expected that other fossils of this species will be found in deposits belonging to this period. The occurrence at Lake Gnarpurt suggests that the area had a lower rainfall than at present, and sparser vegetation. Lake Gnarpurt was probably drying out seasonally, allowing the formation of the marginal lunette, in which the kangaroo skeleton was incorporated.

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Eucalypts

by J. H. WILLIS

An address given to the General Meeting of F.N.C.V. on 10 December, 1973.

Many talks at F.N.C.V. have involved our "gum-trees", e.g. in June, 1969 when Madge Lester spoke on "Familiar Plants of the Family Myrtaceae", and in February, 1965 when the late Ernie Hanks addressed the Club on "Trees and Birds"—Mr. Hanks loved the eucalypts and could always be counted upon to give us a whimsical, yet very informative address.

One makes excuse for introducing this topic again, at the final meeting of the year, because eucalypts are tremendously important to us all. These trees completely dominate the fertile fringe of the Continent and also many parts of the arid land; so that in their absence (e.g. when acacia scrub or saltbush takes over) the countryside doesn't look distinctively Australian. No other comparable area in the world is so completely dominated by one genus of trees, not even the extensive pine forests of North America or Eurasia. At the latest published estimate (in 1971) there are almost exactly 400 different species of *Eucalyptus*, with a good many sub-species, and only seven of them occur naturally outside Australia; these few are all in New Guinea, a single species extending north to the Philippines. One eucalypt (*E. regnans*) is the tallest flowering plant in the world. This, and a number of other big species are the basis of the Australian timber industry which, in Victoria alone, provides the State with several million dollars in royalties every year. Eucalypt timber is widely used for building and construction works, as well as paper pulp.

The blossoms of many kinds are the chief source of Australia's honey, while eucalyptus oil and charcoal are minor products. Such smaller, hardy species as the mallee and snow gum play a highly significant role in soil protection—from wind erosion in Mallee districts to water erosion in the Alps.

Apart from these directly economic advantages, eucalypts provide the food, shelter and nesting sites for innumerable native animals (e.g. koala, gliders, honeyeaters). They are valuable for gardens and ornamental plantations, have a satisfying and aesthetic appeal to artists and photographers, not to mention increasing numbers of people in search of recreation. So very important are the gum-trees to our Australian way of life that a national Institute of Eucalyptology is being advocated.

The name *Eucalyptus*, meaning "well concealed", refers to the little cap or operculum, which is a fused and hardened calyx that protects the mass of stamens until maturity; it is one of the peculiar features throughout the genus. Bark varies astonishingly—even within a single species. Another peculiarity is the variation in foliage, from juvenile to adult phase, and a tree may bear two quite different-looking types of leaves simultaneously. Still another remarkable feature is the volatile "oil" secreted in leaf glands—a complex of chemicals that is reasonably constant for each species or group of related species; there are cineol, piperitone, citrol or pinene-rich oils, and taste can be a useful clue to identity.

Classification of this vast assemblage has proved a matter of no little difficulty, and no single character can be relied on. Probably anthers afford the most reliable basis for sorting them into major groups. Hybridism is of frequent occurrence among certain species, notably Manna Gum (*E. viminalis*), and this aggravates the taxonomist's troubles.

As early as 1858, Mueller had devised a rough, arbitrary classification based on bark. He recognized five divisions — gum, box, ironbark, stringybark and peppermint (where aroma was also important). With some modification, and a few additional categories, these groups are still being used by foresters, but the gum-barked eucalypts are a very mixed "brew". Bloodwoods are those eucalypts, chiefly tropical, having leaves with distinct upper and lower surfaces, very little aroma, and crowded lateral veins almost at right angles to the midrib; they have been considered more primitive than others (e.g. the more recently evolved stringybarks and peppermints). Pollen studies show that very few eucalypts occurred in southern Australia during the mid-Tertiary period (20-30 million years ago), although conifers, beeches, banksias and she-oaks were frequent in the forests of that time. Recent research suggests that some groups of eucalypts are farther apart in natural relationship to each other than they are from the currently accepted genus *Angophora*.

To conclude on a historical note, the early investigation of our eucalypts seems to have fallen under some kind of unfortunate "hoodoo"; it was a very haphazard and muddled beginning. The first Dutch voyagers (Abel Tasman and others) certainly saw and commented upon sundry eucalypts, but took no specimens home to European herbaria. Collec-

tions were made by Sir Joseph Banks and his team while Captain Cook was in Botany Bay during April 1770. Dr. Daniel Solander took charge of these eucalypts and, soon after returning to Britain, he became keeper of the Natural History section of the British Museum. Although a gifted, intelligent and good-humoured man, Solander had an unfortunately indolent, procrastinating nature; he never got around to describing a single eucalypt and died at the rather early age of 46 — rumour suggests from a surfeit of wine and women.

On Cook's third expedition Daniel Nelson collected the Messmate Stringybark (*E. obliqua*) at Bruny Island, southern Tasmania, in January 1777. This material was made accessible to the French botanist L'Héritier de Brutelle, who visited London in 1787. Before the still dallying English had made up their minds to publish descriptions of the plants brought home from Cook's expeditions, L'Héritier went back to Paris and wrote a book called the *Sertum Anglicum* (an "English Garland") in which he described and figured the first eucalypt, *E. obliqua*, which typifies the whole genus. Soon after his book was published in 1788, L'Héritier was mysteriously assassinated in the street outside his home — so ended his work on eucalypts.

About this time (1792) another French botanist, T. T. H. de Labillardière, collected the first eucalypts from Western Australia; but when his expedition reached Java, all the botanical specimens were confiscated because Holland was then at war with France. Miraculously, they were not destroyed and were eventually restored to Labillardière through the generous personal intervention of Sir Joseph Banks. The great British botanist Robert Brown took home a wealth of eucalypt specimens in

1805, although his first and finest set of botanical specimens had been totally destroyed when H.M.S. Porpoise was wrecked in the Coral Sea during 1803. In 1810 Brown brought out the first volume of his famous *Prodromus* on the Australian flora, but the book's reception was so poor and lukewarm that he was quite discouraged from proceeding with the work, so the eucalypt section never appeared.

The botanical world had to wait until 1867 — almost a century after the initial collecting — for the first proper account of eucalypts, published in the third volume of George Bentham's *Flora Australiensis*. Therein 135 different species are described in fair detail — only about one-third of those recognised to-day, but it reflects the greatest credit on Bentham, who probably never worked from live material of any eucalypt. During the last century many famous names appear in this field, notably Mueller, Maiden, Bailey, Blakely, Black and Gardner and living specialists now continue their work with more sophisticated, modern research techniques.

Eucalypts have been successfully introduced, as timber and shelter trees,

to many warmer parts of the world, and Baron von Mueller was the pioneer of this extensive dispersal programme. Impressive acreages are now covered with these trees in the Americas (e.g. 50,000 acres in California and 40,000 in Brazil), New Zealand, tropical Africa and Mediterranean countries. The Pontine Marshes near Rome were virtually eliminated a century ago by plantations of *Eucalyptus globulus* from seed that Mueller supplied. For this service the great botanist received a papal knighthood, and in 1880 he had this to say about the experiment:

"It was through His Grace, Dr. J. A. Goold, R.C. Archbishop of Melbourne, that plantations of *E. globulus* were first established for subduing the miasmatic exhalations of the Pontinian swamps. Thus, through the enlightened circumspectness of our dignified chief of an ancient church, the sanitary improvements on the fever-swamps were initiated with prospects of that permanency, for which the plans and works of drainage since the time of Appius Claudius (long before the Christian era) had vainly striven."

Congratulations, Jim Willis
from all Field Naturalists, everywhere

J. H. Willis — Joint Honours

On Thursday, 14 March, Mr. J. H. Willis was awarded The Royal Society of Victoria Research Medal for 1973. At the meeting, Professor John Turner announced that Jim's candidature for the degree of D.Sc. had been approved and will be conferred on 24 August at Melbourne University graduation ceremony.

D.M.C.

The Occurrence of *Eucalyptus pauciflora* on the Mornington Peninsula, Victoria

by A. E. SPILLANE*

Eucalyptus pauciflora Sieber ex Spreng, belongs to the snow gum group of eucalypts, which consists of only a few species, varying in size from small to fairly large trees. The tree usually inhabits the higher altitudes of eastern Australia, from South Australia to southern Queensland; it also occurs in Tasmania. Two of its vernacular names are Snow Gum and White Sallee.

On the mainland, *E. pauciflora* reaches altitudes of about 1670 metres. In alpine regions, it merges with *E. niphophila* Maiden et Blakely, which attains altitudes of about 1980 metres. Most botanists now consider that

E. niphophila is a cline form of *E. pauciflora*.

Snow Gum is usually about 7 to 18 metres in height, with a crooked trunk. However, much larger trees are occasionally observed, but they continue to retain the distorted trunks, which are characteristic of the species. The tree sheds its bark very readily, and usually keeps some rough pieces at its base. The leaves are thick and leathery, with irregular veins, more or less parallel to the midrib. The appearance of the tree is greatly enhanced by the beautiful patches of dove grey on the white trunk.

*President, Peninsula Field Naturalists Club.



Plate 1. Snow Gums near the summit of Mount Martha.

It is very tolerant of a wide variety of soils and habitats; while the forests in which it occurs are sub-alpine, wet sclerophyll, dry sclerophyll, savannah woodland, and woodland.

The tree can withstand frost extremely well, and at high altitudes, snow is sometimes present for weeks at a time. Annual rainfall ranges from 508 to 1270 millimetres.

Although Snow Gums occur in mountainous and sub-alpine regions; in Victoria, they are also found in some unexpected areas, at comparatively low altitudes.

An interesting occurrence, is on the Mornington Peninsula. This part of the State, consists of an area of about 777 square kilometres of mainly undulating land; the highest point of which is Arthur's Seat (314 metres) at Dromana. The trees occur in practically pure stands in two localities; while in other areas, they are asso-

ciated with such species as *E. ovata*, *E. radiata*, and *E. viminalis*. The annual rainfall in the region is approximately 736 millimetres.

Areas of occurrence

Travellers to the Peninsula can get their first sighting of Snow Gums by journeying south along Overport Road, Frankston, where sporadic specimens occur along the roadside.

The trees are very plentiful and widespread at Mount Eliza; near the summit (153 metres) some large groups are growing in pure stands. They can be seen on each side of the east end of Humphries Road; and beside Nepean Highway, just west of Mount Eliza Way. Most of the Snow Gums in this district are growing on private land. Fortunately, the majority of the residents appreciate the beauty of the trees, and retain them to grace their gardens.

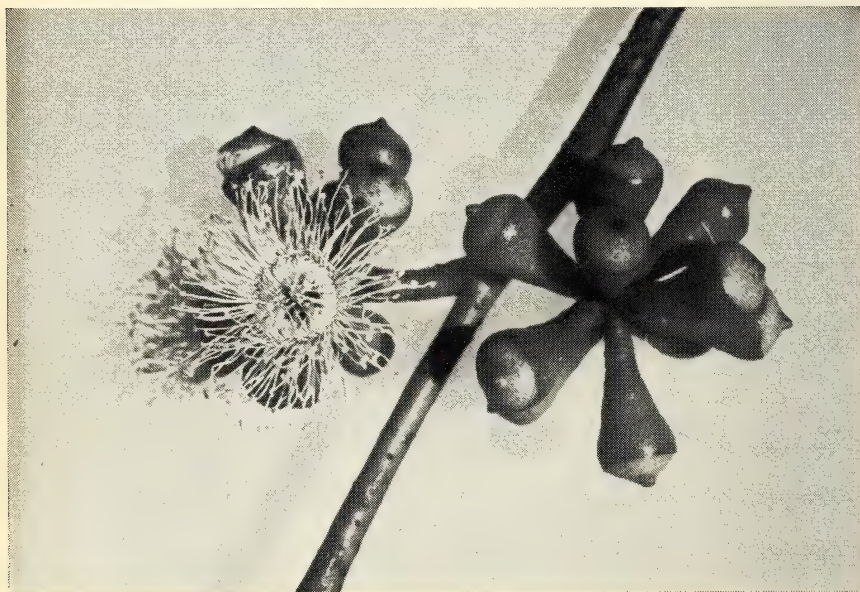


Plate 2. Buds of *Eucalyptus pauciflora*.



Plate 3. Fruits of *Eucalyptus pauciflora*.

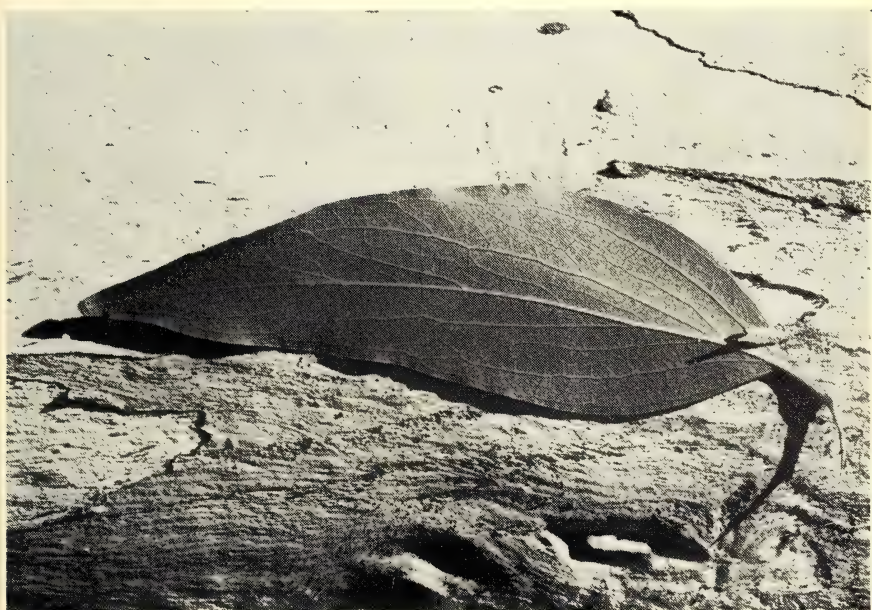


Plate 4. Bark of *Eucalyptus pauciflora*, and leaf showing longitudinal venation.

They may be observed along the sides of Hastings Road, near Baxter, and continue along this road to near Somerville.

The trees are fairly common in an area roughly bounded by Eramosa, Coolart, Tyabb and Derril Roads. They are most conspicuous in Bungower Road in the same area. A very pleasant stand can be found growing in the paddocks around the Mornington Reservoir.

At Tyabb, they are growing by the roadside at the eastern end of O'Neil Road. Approaching Hastings a group of them can be sighted by the roadside near Barclay Crescent.

They are also found sporadically along Moorooduc Road, from Bungower Road to just beyond its junction with Nepean Highway

On the top of Mount Martha (164 metres) Snow Gums are growing in abundance. They appear to have

reached their optimum development in this part of the Peninsula, where some of the trees are magnificent specimens.

A few nice trees are flourishing by the side of Boundary Road near its junction with Hodgins Road, quite close to Devilbend Reservoir. Another small patch of them can be seen approaching Red Hill South, along the Main Spur Road.

A very interesting occurrence of Snow Gums is at Rosebud, where a few sturdy trees are along the side of Jetty Road about 800 metres from the beach. They are especially interesting as they are growing near sea level.

Conclusion

The Mornington Peninsula is developing at such a rapid pace that it would be a great pity if these unique and delightful trees were to be destroyed in the process. It behoves the



Plate 5. A fine specimen of Snow Gum in Mount Martha Park.

Readers' Nature Notes

A Possum Story

Mrs. Ellen Lyndon of Leongatha in Victoria writes of the following tragic story.

Walking around under mature gum trees on a friend's property, with an eye on the birds, a dark object hanging from a limb, about 7-8 metres from the ground, came into focus. Its size and shape suggested a roosting Flying Fox, obviously a long dead one. The binoculars were fetched for a closer examination, and a somewhat tragic story pieced together.

At some time, perhaps years before, the tree had been blowing about in a gale and a forked lateral limb had split at the junction of its two minor branches, the crack opening and closing in the wind. A Silver-grey Possum had been fooling about in the tree. Its bushy tail had worked into the split so that the tip was uppermost and the thicker butt and body dangled on the down side. Here the poor beast must have remained trapped, its tail caught as if in a vice, till it died a miserable death. In time the front

half of the carcass fell away just behind the forelegs, so that all that remains is the bare bleached rib cage with the blackened rump and hind legs still encased in the shrunken hide.

The split in the fork of the branchlets has mended till it is barely discernible. The long curling point of the possum's tail is reduced to a black mark on the green bark above, and the thick butt of the tail apparently emerges straight from out of the solid limb, below. Swamp Gum is a fairly brittle wood, and, considering the evidence before us, this is how we interpreted the story.

Has anyone except myself and the birds noted the establishment of the introduced plant *Duchesnea indica* Focke (1888), Indian Strawberry, in Sherbrooke Forest in the Dandenong Ranges? Since I noted it growing abundantly along some walking tracks early in 1973 I have seen it produce bright yellow flowers and small red strawberry fruits. It is, I believe, previously unrecorded in Victorian grid area N.

Snow Gums on Peninsula

(continued)

municipalities in which they occur to do everything possible to preserve them.

As most of the Snow Gums on the Peninsula are growing on private land, or along the sides of roads, the chances of them being able to reproduce and ultimately survive in a large proportion of the areas noted above are very slim indeed. However, it is heartening to know that they are reasonably safe on Mount Martha, as most of them are growing on parkland, and that two reserves in the park have been set aside principally for their preservation.

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White Ibis Rookery Near Benalla

In the "Victorian Naturalist" Vol. 78, 1962, a note has been sent in by a reader which describes a small White Ibis rookery 12 miles (20 km) north-west of Benalla. This rookery has been kept under close surveillance over the past few years, but unfortunately no nesting data has been taken although rough approximations have been made. The information below is a summary of nesting data gathered on the 11 November, 1973 and may interest some readers. Nests listed are those that were being or had been used (as indicated by fresh nest stain) although many un-used nests from previous years were seen. Numbers of eggs in nests and observations on nest young are included. A count of juveniles that had left the nest and grouped on logs was made. Similarly a count was made of the dead juvenile ibis floating in the water, and in nests. Only one abandoned nest was found, this contained 3 dead down-covered young. Of the eggs examined all were approximately 4.1 cm by 6.5 cm although one nest with two very long thin eggs measuring 3.5 cm by 7.7 cm was seen.

During the examination the juvenile ibis were disturbed as little as possible by using binoculars to count from a distance, but often when nests were grouped together on stumps and logs, large feathered juveniles dropped into the water at my approach. These usually swam away a few metres and climbed on to a branch or log. As the observations were done alone it was a very slow process wading in the thigh deep swamp, so the water was left every hour to allow parent birds to resume nesting activities for another half an hour.

Summary of Observations:

1. 160 nests were examined, most of which were situated on top of low stumps. Some nests were built on logs or in trees. One Ibis was observed on a nest in a tree at a height of 8 metres from the water.
2. 128 eggs were counted. All nests contained three eggs or less, except for three nests which contained four eggs each.
3. The young ibis observed numbered 191. These were divided up as follows: small down covered 53, large down covered 27, small feathered 42, large feathered 54, juveniles away from nests 15.

Observations planned for the next few years should throw more light on the yearly cycle of this swamp. We can see, though, a significant breeding potential for a useful bird such as the White Ibis. A rough approximation for the increase in population from the reproduction at this swamp stands at about 300 individuals assuming a mortality of about seven per cent.

Bill Osborne, 28 February, 1974
Benalla Field Naturalist Club

SUZANNE GRIGGS

How Aggressive are Butcher Birds?

A pair of Grey Butcher-birds is frequently heard calling from the trees which fringe the Reserve opposite our home in the seaside suburb where we live, and their delightful warbling can be heard not only early in the morning, but also at frequent intervals throughout the day.

Since the breeding season, their number has increased to four. All of them have been frequent visitors to the trees in our garden, and are pleased to accept scraps of raw meat

Readers' Nature Notes (continued)

thrown on to the back lawn, or to peck at bones which have scraps of cooked meat on them.

Butcher-birds, however, have a much more sinister reputation where other birds are concerned; particularly in the case of small birds in nests and others which unwisely poke their heads out of cages. Fortunately, there is some reason to believe that most of the food of a Butcher-bird consists of items such as insects and small lizards, and that it is only on rather rare occasions that they attack other birds.

However, it is true that many other birds show a definite dislike of Butcher-birds and harass them at every opportunity. We have been very interested to observe the reactions of the Butcher-birds when they have been attacked by Red Wattle-birds and, believe it or not, by an Indian Turtle-dove. The tactics of the attacking bird were usually to

land on a branch, obviously with aggressive intent, so close to a Butcher-bird that the latter was forced to fly to a new position. The same procedure was then repeated, perhaps a number of times.

At no time did a Butcher-bird retaliate as a result of the unfriendly treatment which he received, but simply flew away or flew to a new position on the same tree. Although Butcher-birds are said to defend their territory, an activity in which the female participates, we are still wondering how aggressive Butcher-birds are.

In the meantime, until we have confirmation of their nasty habits, Butcher-birds will be welcome in our garden and we shall continue to enjoy their pleasant warbling, not only throughout the day but also throughout the year.

A.E.B.

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The Origin of Generic Names of the Victorian Flora

Part 2—Latin, Greek and Miscellaneous

[continued from 91 (2)]

by JAMES A. BAINES.

***Argemone.** Gk name of a poppy-like plant, from Gk argemon, cataract, the plant once being reputed to cure cataract of the eye. **A. mexicana* is Prickly Poppy.

Aristida. Lat arista, an awn, alluding to the trifid awns. Victoria's three species are known as Wire-grasses and Spear-grasses.

***Arrhenatherum.** Gk arrhen, male; ather, awn or beard of wheat or other grain. Alluding to the awn of the male flower. **A. elatius* is False Oat-grass.

Arrhenechthites. Gk arrhen, male (as above), prefixed to Gk erechthites, groundsel. The superseded genus *Erechthites* (so-spelt) is now included in *Senecio*. *A. mixta* (syn. *S. mixtus*) is Purple Fireweed.

***Artemisia.** Named by L. after Artemis, Gk goddess of chastity . . . the common names of *A. vulgaris*, Wormwood, Lad's Love and Old Man, have odd relevance here! Our introduced species is *A. verlotorum*, Chinese Wormwood or Verlot's Mugwort.

Arthrocnemum. Gk arthron, joint; kneme, tibia or lower leg; the stems being jointed. Victoria's four species are well known as Glassworts.

Arthropodium. Gk arthron, joint; podion, a little foot; alluding to the jointed pedicels. Our two species are Vanilla Lilies.

***Arundo.** **A. donax* (Giant or Danubian Reed) sometimes persists, but is not really naturalized. *Arundo* is the Lat word for reed. Four Victorian native species formerly included in *Arundo* are now *Danthonia* (2), *Phragmites* and *Poa* spp.

***Asclepias.** Gk asklepios was the name of Milkweed and Butterfly Weed, in honour of Asklepios, god of medicine, who in Lat was called Aesculapius. Some of the species were used in medicine. Best-known of our three introduced species is *A. fruticosa* (syn. *Gomphocarpus*), Swan Plant, which has become a favourite host plant of Wanderer or Monarch butterfly larvae, the other two species being known as Cotton-bushes.

***Asparagus.** Gk asparagos, the classical name for the edible species, **A. officinalis*, originally from the Persian, becoming asparagus in Latin. The less-accepted vulgar name, Sparrow-grass, is another amusing example of folk etymology (cf. Gallant Soldier for *Galinsoga*, see Part 1). The species well established in our coastlands, **A. asparagoides*, from South Africa, is specifically named 'asparagus-like' because, although a true *Asparagus*, it was previously referred to *Myrsiphyllum* then to *Medeola*. Though not in the same tribe of the Liliaceae as *Smilax*, it is called smilax by florists, hence the accepted common name, *Smilax Asparagus*.

Asperula. Diminutive of Lat asper, rough, an allusion to the rough stems of the European species from which the genus was named, **A. odorata*, Sweet Woodruff, which is now *Galium odoratum* and is not naturalized here. Only some of our nine native species are rough-stemmed (see Willis), eight of them known as woodruffs and one as a bedstraw.

***Asphodelus.** Gk asphodelos (accented on second syllable), the classi-

cal name of the true Asphodel, which name became Affodill in Old English, corrupted to Daffodil by 1548, and applied ever since to the genus *Narcissus* (the asphodel of the poets), which is in the family Amaryllidaceae. The name Asphodel should be restricted to species of *Asphodelus* (Liliaceae), our introduced species, **A. fistulosus*, being known as Onion-weed, Wild Onion or Asphodel. In Greek legend the asphodel was the most famous of the plants of the underworld, Homer describing it as covering the great meadow, the haunt of the dead.

Aspidium. Gk aspidion, a shield, referring to the indusium. Our shield-ferns previously included in this genus are now in *Polystichum* and *Lastreopsis* within the family Aspidiaceae.

Asplenium. Gk a-, not; splen, spleen; a reference to this fern's traditional use in treatment of ailments of the spleen and liver, although women were warned against it because it was reputed to cause barrenness. Many of these long-standing beliefs in the curative properties of plants were irrationally based on fancied resemblances to the organs concerned, supposedly put there by the Creator for the guidance of man! The common name Spleenwort is a reminder of this pathetic fallacy. Gk asplenon (family Aspleniaceae).

Astelia. Robert Brown named the genus in 1810, adopting the name given by Banks and Solander, who collected the first species. Solander probably coined the name from Gk aster, a star, changing the r to an l because Asteria would be confused with the then existing generic name Aster. (Flowers star-shaped.)

***Aster.** Gk aster, a star, from the shape of the flowers. Our introduced species, **A. subulatus*, is Aster-weed or Shrub Aster. The genus is the

basis of the family name Asteraceae, which is being increasingly used by botanists who wish to bring out-of-pattern names like Compositae into conformity with the -aceae suffix added to the generic name of a key genus (cf. Lamiaceae for Labiatae, Poaceae for Gramineae and Fabaceae for the papilionaceous section of Leguminosae more often now called family Papilionaceae).

Asterolasia. Gk aster, star; lasios, hairy, alluding to the stellate hairs on the leaves, hence the common name Star-bush for our three species.

***Asterolinon.** Linnaeus named this Mediterranean plant *Lysimachia linum-stellatum*, but in 1820 it was transferred to a new genus by Link and Hoffmansegg, who translated the Lat specific name, which means starry flax, into Gk (aster, star; linen, flax, also net). Naturalised only in the Bendigo district.

Astroloma. Gk aster, star; loma, fringe, referring to the hairs inside the flower. Our three species are Pine Heath, Flame Heath and Cranberry Heath.

Astrotricha. Gk aster, star; thrix, trichos, hair (trichos is the genitive). The foliage and stems are 'stellate-tomentose', hence the common name Star-hair given to all our five species, a literal translation of the generic name.

Atherosperma. Gk ather, awn; sperma, seed; in reference to the hairiness of the seeds. *A. moschatum* is Southern Sassafras, its specific name being in allusion to the musky perfume.

Athrixia. Gk a-, no; thrix, hair; some species being glabrous. Our species, long known as *A. tenella*, Wirewort, is now *A. athrxioides*, because named *Panaetia athrxioides* by Sonder and F. Mueller in 1853.

To be continued

Victorian Non-Marine Molluscs – No. 13

by

BRIAN J. SMITH,

Curator of Invertebrates,

National Museum of Victoria.

Austrosuccinea australis Ferussac, 1821

This very unusual land snail, which lives in damp places in widely scattered areas of the State and appears at first sight to be very similar to a freshwater snail is one of the biggest puzzles in the Victorian non-marine mollusc fauna. The species is puzzling for two reasons. Firstly it appears to be able to survive and thrive in a wide diversity of habitats, over such an extended area. Secondly, the family to which it belongs, the Succineidae, is itself an enigma. Experts still do not agree about its relationship to other groups and its position in the classification scheme of non-marine molluscs.

The shell is thin, fragile, often transparent, horn colour reaching about 7-9 mm in length (Figure). The spire is short and acute, with few whorls, the body whorl being much enlarged and comprising approximately 5/6 of the length of the shell. The animal appears large and flaccid but does not protrude far out of the shell. The eyes are borne at the tips of short tentacles. In most cases large dark pigment blotches on the mantle are visible through the shell of the body whorl.

The species is usually found in damp areas and found living close to the ground on the undersides of thick vegetation. In the very sheltered coastal areas it is found associated with a saltmarsh environment on the landward fringe of the marsh. It has been found in such environments in

localities such as Mallacoota Inlet, Lake Reeve, Westernport and the Glenelg River. It is also known from similar habitats in South Australia, New South Wales and Tasmania. However it has also been found far inland in the Mallee and Wimmera in damp environments.

Much more material and accurate habitat data is needed of this very unusual snail before it can be clarified as to what factors control its distribution and survival or indeed whether we have a single species or a group of very closely similar but ecologically distinct forms.

A. australis x 4



Drawing by Miss R. Plant

Ecology of some *Eucalyptus* Woodlands in the Holey Plains, Gippsland, Victoria

by

R. F. PARSONS* and G. W. CARR*

Introduction

Native vegetation is rapidly being cleared all over Victoria, especially on relatively flat terrain, even though in many areas nothing is known of its ecology or even its floristics. One such area which may be cleared is the northern part of the Holey Plains near Rosedale (Figure 1), an undulating sandy area of Crown Land whose future is uncertain. The only available botanical data for the Holey Plains area are the general floristic lists of Beaglehole (1972; 1973), which omit substantial parts of the northern edge (such as the *Eucalyptus viminalis* woodlands), and the brief ecological summary of Thornley (1972).

The northern and western edges of the uncleared Crown Land of the Holey Plains carry small fragments of *Eucalyptus viminalis* var. *racemosa* (Figure 1) woodlands. They are the only surviving remnants of a formerly widespread community. Going towards the centre of the Holey Plains, all these fragments rapidly give way to the widespread *E. nitida* woodland (Thornley, 1972).

In the present study, we describe transects (area A in Figure 1) from pure *E. viminalis* woodland through an ecotone to "pure" *E. nitida* woodland, determining the vascular plant species present and their relationship to varying soil and elevation. These results are then compared with those from a briefer study of a very similar area (area B in Figure 1) which differs mainly in that *Pteridium esculentum* (bracken) is much more predominant throughout the understory.

Such bracken-rich understories are very common throughout the Holey Plains. The reasons for this are discussed and the effect of bracken dominance on other understorey species is investigated.

Mean annual rainfall for both study areas is about 63 cm (25 in.). Other regional data is given by Thornley (1972). Elevation in both areas ranged from 38.1 m to 70.1 m above sea level.

Methods

A series of quadrats (6 m x 2 m) were laid out along a number of line transects, and the soil profile described (by augering) and species cover determined in each quadrat. For area A all 180 quadrats were within an area 300 m x 41 m. In area B 18 quadrats were done in "pure" *E. viminalis* woodland spread over about the same altitudinal range as the first (lowest) 30 m of the transects in area A (which also carried *E. viminalis* woodland), and 18 more were done in "pure" *E. nitida* woodland at similar altitudes to those of this community in area A.

Determination of relative elevation was made by dumpy levelling (area A only), and soil pH of the surface 3 cm by C.S.I.R.O. soil pH test kit (Inoculo Labs., Surrey Hills, Victoria). The bulk of the work was done in May 1973, with supplementary plant collections in December 1973. Consequently some spring annuals may be omitted from the species list.

*Botany Dept., La Trobe University, Bundoora, Vic. 3083.

Results

All soils examined had A_1 horizons of greyish brown to very dark grey sand with organic matter, over A_2 horizons of greyish brown to pale brown sand. B_1 horizons were of pale brown to light yellowish brown sand faintly mottled with light grey patches. At the lowest elevations in both areas this continued unchanged to at least 140 cm except for a slight increase in strength of colour. At higher elevations in area A, the B_1 horizon overlies a layer predominantly of fine and coarse gravel (up to 6 cm diam.) of rounded ironstone and quartz with pink sand. The gravel layer overlies reddish yellow sand (all colours are

Munsell colours of air-dry soil). At high elevations in area B the B_1 horizon grades into reddish yellow sand at 100 cm, and sand continues to at least 130 cm, becoming paler in colour, with no gravel layers being found. Surface soil pH was in the range 6.0 to 6.5 throughout both areas, except for the highest parts of area A (pure *Eucalyptus nitida*) where pH declined to 5.0 to 5.5.

Vegetation was eucalypt-dominated woodland throughout. Going upslope, the size of trees gradually decreased, while composition of the tallest stratum changed from pure *E. viminalis* to *E. viminalis* — *E. nitida* to pure *E. nitida* (Figure 2). In the

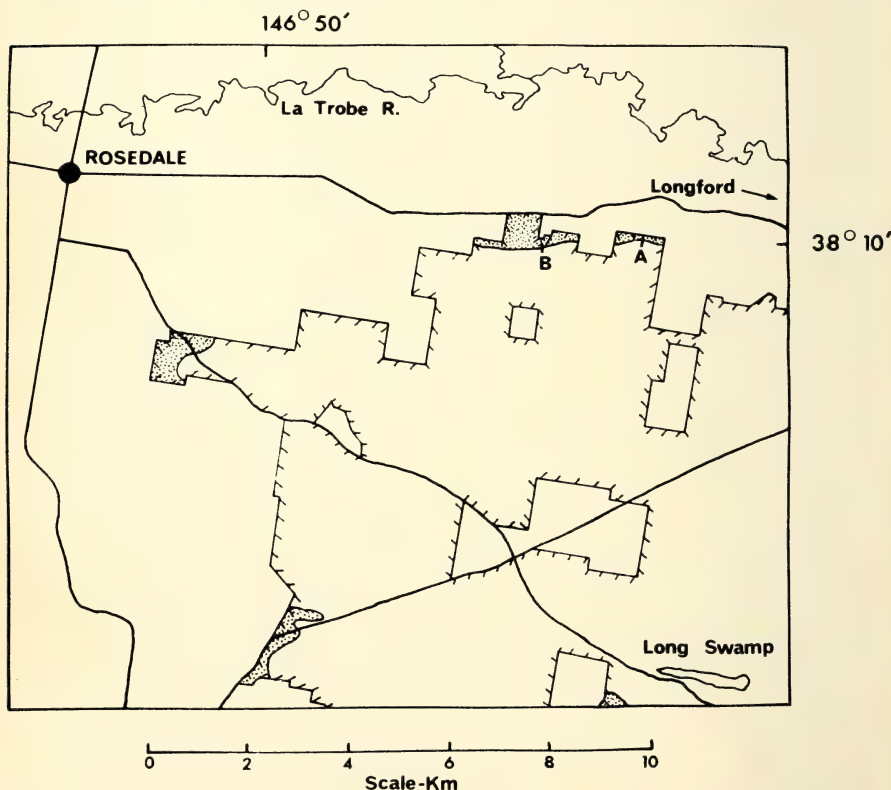


Fig. 1. Location of study areas A and B in the western section of the Crown Land of the Holey Plains Block. Line marked with dashes shows boundaries of Crown Land, dotted areas show *Eucalyptus viminalis* var. *racemosa* woodlands (after Thornley 1972).

understory in area A, *Brachyloma daphnoides* was very common throughout. *Pteridium esculentum* was very common at low elevations but became much less common at the higher elevations, where *Leptospermum myrsinoides* became very prominent (Figure 2). *Imperata cylindrica* and *Scirpus nodosus* were confined to the pure *E. viminalis* zone, and the herbs *Dichondra repens*, *Hydrocotyle* spp., *Pterostylis concinna* and *P. nutans* became less common going upslope. A number of sclerophyllous shrubs, including *Banksia marginata*, *Bossiaea cinerea*, *Grevillea chrysophaea*, *Hibbertia stricta*, *Leucopogon ericoides* and *L. virgatus* were virtually confined to the highest elevations under pure *E. nitida*.

All these shrubs were absent from area B, where cover of *Pteridium esculentum* throughout was usually much higher than in area A. A number of herbs apparently absent from area A occurred throughout area B, including *Chiloglottis reflexa*, *Hypericum gramineum* and *Themeda australis*. In area B, *Leptospermum myrsinoides* was absent and *Brachy-*

loma daphnoides was rarer than in area A.

The pure *E. nitida* zone in area B lacked the diverse sclerophyllous understory of this zone in area A. If the two zones had occurred in identical physical environments, it could have been argued that vegetation differences between them were at least partly due to a more severe fire history in area B, as suggested by its very high *Pteridium esculentum* abundance. However the higher pH of the pure *E. nitida* zone in area B than in area A, and the complete absence of a gravel layer in area B soil profiles raises the possibility that some vegetation differences may be partly due to soil factors, so no detailed comparisons are attempted here.

In contrast, soils under the pure *E. viminalis* zones in the two areas appear very similar, as do the other environmental factors. Under *E. viminalis* in area A, *Pteridium esculentum* cover is usually less than 60%, and falls as low as 5%, while in area B it is usually greater than 90% and is never less than 50%. Such a cover difference in two very similar areas

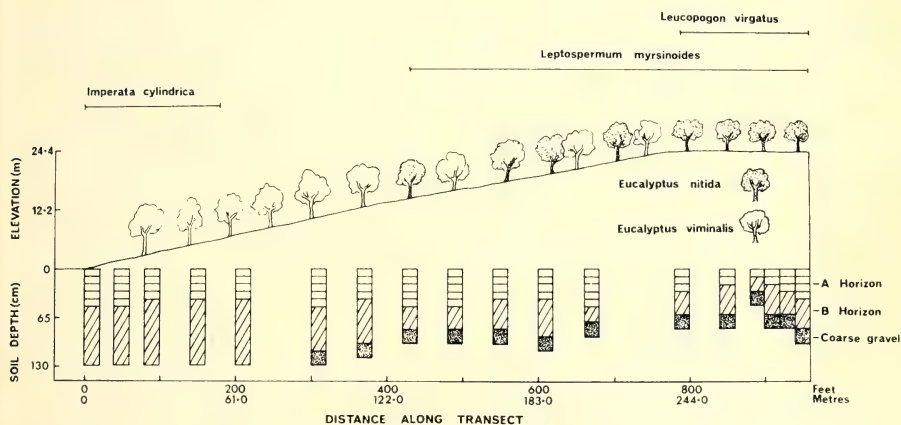


Fig. 2. A typical transect in area A, showing soils, relative elevation and the exact location of the *Eucalyptus viminalis*, *E. viminalis* — *E. nitida* and *E. nitida* communities, as well as the distribution of selected understory species. The direction in going from the lowest end to the highest is south west.

may reflect a more severe fire history in area B. If so, it is important to know whether this has reduced the plant species diversity of the community; that is, whether any species have disappeared as the result of firing itself or of the increased abundance of *P. esculentum* which may ensue. In fact, the average number of species per quadrat in pure *E. viminalis* in area A is 13 and of the same community in area B is 17 (average from 18 quadrats in both cases), so there is no evidence whatever for a reduction of diversity in the bracken-rich area.

Discussion

Obvious vegetation changes were observed with increasing elevation. In area A reduction in stature and change in species composition of the tree stratum was accompanied by changes in the understory from *Pteridium esculentum* — *Brachyloma daphnoides* dominance to *Leptospermum myrsinoides* — *B. daphnoides* dominance, while in general herbs decreased in importance and sclerophyllous shrubs increased. In this area, the lower elevations are likely to be wetter than the higher ones due to movement of water downslope through the sand by gravitational drainage. Nutrients may be carried downslope in solution in the same way, so that water, nutrients or both may contribute to the observed vegetation changes. The changes in pH and depth to gravel with altitude show that soils are not uniform throughout the sequence studied; there may be significant changes in fertility even ignoring the possible movement of nutrients downslope. The increase in sclerophyllous shrubs with altitude suggests that fertility is more likely to decline with increasing altitude than the reverse.

A striking feature of the Holey Plains is the very widespread occurrence of understories dominated by

very dense bracken. It can be argued that these result from severe and/or frequent fires as in other areas (Ash-ton 1969), or that they are related to particular levels of various site factors like water and nutrients. The occasional occurrence of bracken-poor communities like the *E. viminalis* zone of area A on sites apparently identical to bracken-rich ones (the *E. viminalis* zone of area B) suggests to us that fire is at least partly involved. Increased bracken dominance has not reduced plant species diversity in the *E. viminalis* area looked at here. However, assuming that fire may be involved in producing bracken-rich understories, a study is badly needed of *E. nitida* areas which compares bracken-rich stands with bracken-poor ones on identical sites to see if frequent firing has adverse effects on diverse sclerophyllous understories like those found under *E. nitida* in area A.

Of the plant species recorded, the presence in *E. nitida* woodland of an undescribed species of *Prostanthera* related to *P. linearis* deserves special mention. This species is known only from the Holey Plains, and was first discovered by Beaglehole in 1972. In addition, 200 m north of the north-east corner of the Crown Land around study area A, *Eriocaulon scariosum* was found in a roadside ditch. This is only the second record of this species in Gippsland, and is a considerable range extension (see Willis 1970).

Acknowledgements

Our co-authors are the Botany II students at La Trobe University in 1973, whose interest and enthusiasm made the work possible. We thank A. Thornley, F. Noble, R. Russell, D. Simmons and D. Cameron for assistance.

APPENDIX 1 opposite:—
Reference list on page 118.

Vascular plants found in the study areas. Nomenclature follows Willis (1970; 1972). Voucher specimens held at La Trobe University Botany Department Herbarium.

V = found in *E. viminalis* woodland.

M = found in *E. viminalis* — *E. nitida* woodland.

N = found in *E. nitida* woodland.

T = found throughout all three communities.

A = found in area A.

B = found in area B.

(If not specified then found in both.)

DENNSTAEDTIACEAE

Pteridium esculentum T.

POACEAE

Aira caryophylla T, *Danthonia* (including *D. geniculata* and *D. setacea*) T, *Imperata cylindrica* V, *Microlaena stipoides* T, *Poa labillardieri* M, *Themeda australis* BVN, *Vulpia bromoides* BV.

CYPERACEAE

Carex sp. V, *Lepidosperma concavum* T, *Scirpus antarctica* A, *S. nodosus* V.

CENTROLEPIDACEAE

Centrolepis strigosa A.

ERIOCAULACEAE

Eriocaulon scariosum (just outside Crown Land in roadside ditch — see text).

LILIACEAE

Burchardia umbellata T, *Dichopogon strictus* T, *Laxmannia sessiliflora* AN, *Lomandra filiformis* T, *L. glauca* T, *L. longifolia* AV, BVN, *Thysanotus patersonii* T, *Tricoryne elatior* AN, *Xanthorrhoea minor* T.

ORCHIDACEAE

Acianthus exsertus T, *A. reniformis* T, *Calochilus* sp. AN, *Chiloglottis reflexa* BVN, *Diuris* sp. T, *Eriochilus cucullatus* T, *Glossodia major* T, *Pterostylis concinna* T, *P. nana* T, *P. nutans* V, *P. parviflora* AMN, *P. revoluta* T.

CASUARINACEAE

Casuarina littoralis AVM.

PROTEACEAE

Banksia marginata AN, *B. serrata* AVM, BVN, *Grevillea chrysophaea* AN.

LORANTHACEAE

Ameyma pendulum AM.

DROSERACEAE

Drosera glanduligera T, *D. planchonii* AMN.

CRASSULACEAE

Crassula sieberana BV.

FABACEAE

Bossiaea cinerea AN, *Dillwynia glaberrima* AN, *D. sericea* AN, *Glycine*

clandestina T, *Gompholobium huegellii* AN, *Hovea heterophylla* AN, *Kennedia prostrata* AMN, *Platylobium obtusangulum* AM.

OXALIDACEAE

Oxalis corniculata AVM.

RUTACEAE

Correa reflexa AN.

EUPHORBIACEAE

Phyllanthus hirtellus T, *Poranthera microphylla* BV.

RHAMNACEAE

Cryptandra tomentosa AN.

DILLENIACEAE

Hibbertia acicularis AVMN, *H. stricta* AN.

HYPERICACEAE

Hypericum gramineum BVN.

VIOLACEAE

Viola hederacea AM.

THYMELAEACEAE

Pimelea humilis T.

MYRTACEAE

Eucalyptus melliodora AVM, *E. nitida* AMN, BN, *E. viminalis* var. *racemosa* AVM, BV, *Leptospermum myrsinoides* AMN, *L. phyllicoides* AVM, BVN.

HALORAGACEAE

Haloragis sp. T.

APIACEAE

Hydrocotyle laxiflora T.

EPACRIDACEAE

Acrotriche serrulata AMN, BV, *Astroloma humifusum* T, *Brachyloma daphnoides* T, *Epacris impressa* T, *Leucopogon ericoides* AN, *L. virgatus* AMN, *Monotoca scoparia* AMN.

GENTIANACEAE

Centaurium minus AVM, BVN.

CONVOLVULACEAE

Dichondra repens AVM, BN.

BORAGINACEAE

Cynoglossum suaveolens AV.

LAMIACEAE

Prostanthera sp. nov. AN.

SCROPHULARIACEAE

Veronica plebeia AVM.

RUBIACEAE

Opercularia varia T.

CAMPANULACEAE

Wahlenbergia stricta AVM, BVN, *W. tadgellii* AVM.

ASTERACEAE

Cirsium vulgare T, *Conyza bonariensis* BVN, *Cotula australis* V, *Gnaphalium candidissimum* BV, *G. involucratum* V, *G. japonicum* BV, *G. purpureum* BV, *Helichrysum scorpioides* BN, *Hypochoeris glabra* T, *Lagenophora stipitata* T, *Leontodon taraxacoides* T, *Microseris scapigera* AMN, *Senecio lautus* BVN, *S. sp.* AVM, BVN, *Sonchus oleraceus* B.

Field Naturalists Club of Victoria

Secretary's Annual Report

1973-74

1973 has again been a reasonably satisfactory year with a full programme of general and group meetings and excursions.

The Club Improvement Committee has prepared a new publicity leaflet giving information on the various groups and has completed the revision of the Articles of Association and By-Laws, but legal delays have prevented these being ready for adoption in 1974. Miss Kathleen Hall had virtually completed the monumental task of preparing the subject index to "The Victorian Naturalist" before her recent sudden death. The index is now being typed and it is hoped to have it published later in the year. It is hoped also to re-issue "Ferns of Victoria and Tasmania" which has been out of print for some time but is still in strong demand. Mr. Willis is at present making the necessary corrections to the old edition.

Bairnsdale Field Naturalists Club has suggested that a National Park could be established in the Genoa area as a memorial to Norman Wakefield, and the Club is giving this proposal its full support.

On the debit side, lack of involvement by members remains a problem, and although the Secretary attended the recent National Conservation Study Conference in Canberra, the Club has had no effective voice in the many conservation issues which are of vital concern to members. It is hoped to establish a conservation group this year so that the Club can play a more active role in these issues in future.

We have been able to balance our books this year only with the aid of grants of \$1,000 from the Victorian Government, and \$605 from the Ingram Trust towards the cost of publishing "The Victorian Naturalist". With continuing rapid increase in prices, it seems inevitable that subscriptions will have to be increased fairly soon. Membership has remained virtually static, increasing by only eleven, to 777 members during the year. An increase in membership would assist substantially in offsetting rising prices.

The secretarial procedures have been greatly streamlined and most of the routine work of running the Club is now undertaken by Mrs. Pat Herman, paid Assistant to the Secretary, without whose capable help the system would have broken down completely by now. Nevertheless the Secretary still does not have the time to give the Club affairs the attention they deserve, and would be happy to hand over to any member who felt they could do a better job.

The Australian Natural History Medallion for 1973 was awarded to Edmund Gill who has had a long association with the Club and has contributed many articles to "The Victorian Naturalist".

In conclusion, we feel that although there have been no outstanding achievements, the Club has continued to progress in 1973.

ROGER RIORDAN,

Honorary Secretary.

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Annual Meeting — 13 March

The attendance at the Annual Meeting was considerably smaller than is usual at general meetings; it is unfortunate that so many usually regular attenders missed hearing the President's address. Mr. Kelly returned to the practice of some of the earlier Club Presidents and spoke about his own studies in natural history; in this case beetles of the genus *Paropsis*. He gave a most interesting insight into the history of the study of the genus and the complexities of its taxonomy.

Nominations for Council did not exceed the number of positions to be filled and the following were declared elected:—

President — Mr. Peter Kelly.

Vice-Presidents — Mr. Leigh Winsor,
Mr. Michael Coulthard.

Secretary — Mr. Roger Riordan.

Asst. Secretary — Mrs. Margaret Corrick.

Treasurer — Mr. Harry Bishop.

Asst. Treasurer — Mr. Ian Cameron.

Editor — Mr. G. Ward.

Asst. Editor — Mr. G. Douglas.

Librarian — Mr. Jon Martindale.

Asst. Librarian — Mrs. May Hampton.

Excursion Secretary — Miss M. Allender.

Residual Council — Mr. R. Gibson,
Mr. T. Sault, Dr. B. Smith, Mr.
J. H. Willis.

At the opening of the meeting members paid tribute to the memory of Miss Kathleen E. Hall who died suddenly on 15 February. Miss Hall was the daughter of Dr. T. S. Hall, Lecturer in Zoology at Melbourne University. She was herself a graduate of that University and spent most of her working life as a teacher of Biology. Shortly before her death she completed the mammoth task of indexing the whole of the *Victorian Naturalist* and preparations are in hand for this to be published by the Club.

The President announced that the inaugural meeting of the new Club Conservation Group would be held in the Herbarium Hall on Wednesday, 10 April. Guest speaker will be Mr. Ross Garnet who will speak on the history of the F.N.C.V. in the conservation movement in Victoria.

Exhibits at the meeting included some microscopic green algae collected from Lake Lonsdale; an *Apanteles* wasp; eggs of the green Lace-wing and some *Posidonia* balls collected from the shore on Flinders Island. Mr. Kelly also exhibited some larvae of *Paropsis* beetles in connection with his talk.

Speaker at the April meeting will be Mr. Geoff Douglas of the Vermin and Noxious Weeds Department.

Botany Group — 14 March

It was pleasing to see another good attendance at this month's Botany Group meeting. The speaker, Mr. Bruce Fuhrer, gave a most interesting talk on "Some Plant Associations of Rushworth Forest"; his slide collection included some outstanding shots of the area at peak flowering time, as well as close ups of some of the more uncommon species. Of particular interest were the photographs of the tiny ephemeral plants which had flowered so prolifically during the wet periods of 1973. Mr. Fuhrer reported that the Forests Commission had recently declared a square mile of the area a Forest Park for the preservation of several rare species, including *Eremophila gibbifolia*, *Phebalium obcordatum* and *Stipa breviglumis*. During his study of the forest during the last two or three years the list of plant species recorded has been almost doubled; it is apparent that Mr. Fuhrer's investigations and representations to the Forests Commission played an important part in the recognition of the area for special conservation.

Two staff members of C.S.I.R.O. Canberra were present at the meeting and appealed for assistance in their search for records of the original vegetation of the basalt plain between Melbourne and Bacchus Marsh.

The Group's excursion committee has planned several trips for the forthcoming months. Outings will be held on the last Saturday of the month, beginning with a trip to Westernport on 30 March. It is planned to visit Green's Bush in April and Tonimbuk in May. It is expected that a weekend trip will be organised for the spring.

It has been decided to cancel the Group's April meeting as it falls on the Thursday evening prior to Good Friday. Guest speaker at the meeting on 9 May will be Mrs. Winifred Calder who will speak on some aspects of the vegetation of the Westernport region.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

Key Office-Bearers, 1973-1974.

President:

Mr. P. KELLY

Hon. Secretary: Mr. R. H. RIORDAN, 15 Regent St., East Brighton, 3187. 92 8579

Treasurer: H. BISHOP. Address Correspondence to National Herbarium, The Domain, South Yarra.

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Hon. Librarian: Mr. J. MARTINDALE, c/o National Herbarium, The Domain, South Yarra.

Hon. Excursion Secretary: Miss M. ALLENDER, 19 Hawthorn Avenue, Caulfield 3161. (52 2749.)

Magazine Sales Officer: Mr. D. McINNES

Archives Officer: Mr. CALLANAN, 29 Reynards Street, Coburg 3058. Tel. 36 0587.

Group Secretaries

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Day Group: Mrs. J. STRONG, 1160 Dandenong Rd., Murrumbeena (56 2271).

Entomology and Marine Biology: Mr. J. W. H. STRONG, Flat 11, "Palm Court", 1160 Dandenong Rd., Murrumbeena 3163 (56 2271).

Field Survey: Miss L. BARRACLOUGH, 4-7 Chrystobel, Cres., Hawthorn, 3122

Geology: Mr. T. SAULT.

Mammal Survey: Mr. R. J. GIBSON, 7 Cook Street, Abbotsford, 3067.

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Rates of Subscriptions for 1973.

Ordinary Members	\$7.00
Country Members	\$5.00
Joint Members	\$2.00
Junior Members (under 18 years)	\$2.00
Junior Members receiving Vict. Nat.	\$4.00
Subscribers to Vict. Nat. (Aust. only)	\$5.00
Overseas Subscribers	\$6.00
Affiliated Societies	\$7.00
Supporting Members	\$10.00
Life Membership (reducing after 20 years)	\$140.00

The cost of individual copies of the *Vict. Nat.* will be 45 cents (52 cents — overseas requests).

Full-time Students between 18 and 21 years pay at Junior Member rates.

All subscriptions should be made payable to the Field Naturalists Club of Victoria, and posted to the Subscription Secretary.



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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 13 May — At National Herbarium, The Domain, South Yarra, commencing at 8 p.m.

Speaker — Mr. Arthur Brook: "A Year in the Life of a Frog".

New Members —

Ordinary:

Miss Ros Crompton, 1 Dunraven Ave., Toorak, 3142. *Botany*.
Mr. Alan G. Haintz, 37 Phillip Ave., Doncaster, 3108. *Geology*.
Miss Elizabeth Kerr, 6 Clifton St., North Balwyn, 3104. *Botany and Geology*.
Mr. Tim Thwaites, C/o Janet Clarke Hall, Royal Pde., Parkville, 3052. *Mammal Survey*.
Mr. Douglas Jinks, 11 Downes St., Strathmore, 3041.
Dr. Peter R. Milne, 1/278 Brunswick Rd., Brunswick, 3056. *Mammal Survey and Botany*.

Joint:

Mrs. Florence Ottrey and P. J. Ottrey, 12 Baker St., St. Kilda, 3182.
Mr. D. R. Martin and Mrs. S. B. Martin, 14 Rangeview Ave., Chadstone, 3148.

Country:

Mr. John Scoles, Mr. Ian Scoles and Mrs. Joy Scoles, Harmony Lodge, High Camp, via Kilmore, 3601. *General*.

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Wednesday, 15 May — Microscopical Group Meeting.

Thursday, 16 May — Day Group. Bird Observing trip to Blackburn Lake. Leader, Mr. Roy Wheeler. Bring lunch. Ringwood train leaves Flinders Street 10.53 a.m. Meet at Blackburn Station 11.30 a.m.

Thursday, 23 May — F.S.G. Meeting in Conference Room, National Museum at 8.00 p.m.

Saturday, 25 May — Botany Group Excursion to Tonimbuk, transport by private cars, final arrangements at May meeting.

Monday, 3 June — Marine Biology and Entomology Group meeting in Conference Room, National Museum at 8.00 p.m.

Wednesday, 5 June — Geology Group.

Thursday, 6 June — M.S.G. Meeting at Arthur Rylah Institute, 123 Brown Street, Heidelberg at 8.00 p.m.

F.N.C.V. EXCURSIONS

Sunday, 19 May — Macedon area. Coach leaves Batman Avenue, 9.30 a.m. Fare \$2.30 bring lunch.

Sunday, 1 September to Sunday, 8 September — Kangaroo Island. This excursion will start from Adelaide and includes motel accommodation on the Island on D. B and B basis, day excursions and air travel between Adelaide and Kangaroo Island at a cost of approximately \$135. A group booking on the train leaving Saturday evening can be arranged for those desiring it and a concession rate will apply if sufficient members travel at this time. To obtain the concession it is necessary to travel together on the forward journey but those wishing to extend the holiday may return at a later date. A deposit of \$25.00 should be paid to the excursion secretary (cheques to be made out to "Excursion Trust"). Please check if there are vacancies before sending any money.

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Front Cover:

The New Holland Mouse (*Pseudomys novaehollandiae*). This little animal was first recorded from Victoria in May 1970, near Tyabb, 35 miles south east of Melbourne.

The long-awaited report of the Land Conservation Council of Victoria on the Melbourne Study Area has at last been published, in two volumes. It went on sale early last month. Those who wish to make submissions to L.C.C. on matters relating to the report have until the 18th June to lodge them. Most groups in the club are looking at those aspects of the report which concern their field of study. It is hoped many members will obtain copies of the report, and make submissions on those areas with which they are most familiar. The report can be obtained from the L.C.C. Office, 464 St. Kilda Road, Melbourne, for only \$2. It is well worth the price.

The first volume contains 444 pages of text describing in general terms the public land in the areas it covers, and their natural history, together with comments on their value and use. There are also extensive sections on the resources of the area as a whole, and the various demands being made on Crown Land in this most populous part of Victoria. The study area extends along the coast from Lorne to Wonthaggi, while inland it goes East to include the Thompson River catchment then runs North as far as Avenel, including the Eildon, Strathbogie, and Loddon districts.

The second volume is a book of maps. The first map shows the extensive tracts of Crown Land there are in the study area. The other sheets present the population distribution, geology, physiography, topography and rainfall, vegetation, recreation facilities, water supply resources, and power distribution in the area. This is the fifth report published by L.C.C., and is without doubt the most important yet brought out.

It is of interest to note that among candidates for the Senate election this month are two standing as the Victorian Environment Group. They are Mr. Keith Tarrant and Mr. Paul Palmos. Mr. Tarrant is a Councillor of both A.C.F. and C.C.V., and director of the Port Phillip Environment Centre. Mr. Palmos is administrator of the Seaford Foreshore Committee.

More on Gippsland Worms

by BRIAN J. SMITH*

The recent article by Eve (*Victorian Naturalist*, 91 pp. 36-38) on the possible effects on the ecology of South Gippsland of the Gippsland Giant Earthworm brought to light some very keen and interesting observations. This species is a very unusual earthworm, unique to this small region of southern Victoria and I thought it might be of interest to remind members of some of the other interesting facts about this species.

The Giant Gippsland Earthworm, *Megascolides australis* was first described by McCoy in 1878 from a specimen collected by land surveyors from the Brandy Creek district.

The worm is probably the largest species in the world, specimens having been recorded up to 6 feet (1.8 m) in length. As noted by Eve, they appear to favour damp soil and are found close to the surface in winter when the ground is wet; but going deep in summer. They are amongst the very few species of earthworms which have a permanent burrow system. One way their presence can be detected is by the vibration and slight sucking noises they create when passing through the burrow near the surface of the soil. Most earthworms form their burrows by ingesting the soil in front of them but do not appear to re-use the burrow formed by this activity.

Reproduction is also unusual in this species. The behaviour during the act of copulation has not been recorded as it probably occurs below ground. However, the egg capsule laid is very unusual as it is encased in a tough dark brown chitinous outer

case. Capsules have been recovered up to 2 inches (50 mm) long.

The following is an extract from the original description in the Prodromus of the Zoology of Victoria Vol. 1 — Decade 1 page 24:—

“On the first entry of the surveyors into that paradise of land selectors, the Brandy Creek district, on the new Gippsland line of railway, I received from them numerous specimens of this gigantic earthworm with queries as to whether it were a snake or a worm, etc. All of them, from the great diameter of the digestive tube, were almost like small membranous sausage-skins filled with earth, and from their great brittleness each individual was usually received divided into several pieces, the broken ends of which contracted strongly as almost to close the wound, and decomposition setting in so rapidly that very little of the essential characters could be made out. Although I have more recently examined numerous perfect examples, both living and in spirit, I cannot find any male or female genital pores, such as are so conspicuous in *Perichaeta*, the former between some rings on the ventral surface in front of the “cingulum”, and the latter behind it.

“The living worms emit an odour resembling that of creosote. Like the ordinary earth-worms they burrow in the earth, swallowing the portion in front as they bore

*Curator of Invertebrates — National Museum of Victoria.

downwards, casting the portions from which they have abstracted the nutrient particles on the surface of the ground, renewing the surface by a kind of natural trenching which tends to bury the surface beneath a continual top dressing of fresh soil from below.

"I have recently received from Mr. Search several examples from Queensferry of the oval, tough, horny case or capsule, 2 to 3 inches in length, half an inch wide, and terminated by a bunch of filaments at one end, and a shorter pointed extension at the other, in which the young worm of this species is enclosed, nearly agreeing with that of the common earthworm of Europe, except in size. These capsules are greenish and translucent when fresh, but soon become dark-brown and hard in spirit."

However, perhaps the most important aspect of the biology and general knowledge of this species from the land utilisation and survival of the species point of view is that although this is a native animal unique to a small area of Victoria and for which

we are famous all over the world, we still have no idea of the population size or distribution of this very unusual species. The original locality and the locality quoted by Eve are both north of Warragul while specimens in the Museum collection are from as far away as Loch and Korumburra.

It would be very useful to have as many authentic records of this species as possible from many different localities to see if a complete picture can be built up of the distribution of this unusual animal.



Figure 1: Egg capsule of the Giant Gippsland Earthworm showing the semi-transparent wall through which the developing worm can be seen. Drawing by Miss Rhyllis Plant.

An Item of Concern to You and the Club

Subscriptions for the year 1974 are due on 1 January —

It is now April, have you paid your subscription?

If you have, continue enjoying the *Victorian Naturalist* with the satisfaction that you have helped by a prompt payment.

If you have not, please get to work and send that cheque or postal order for your overdue subscription. The rates of subscriptions are on the back page of this magazine.

**Please post direct to The Subscription Secretary, Mr. D. E. McInnes,
129 Waverley Road, East Malvern, Vic., 3145.**

F.N.C.V. Excursion to the Warrumbungle Ranges, N.S.W.

August – September, 1973

by JEAN ZIRKLER

A party of 33 members left Melbourne on 25 August, travelling northward by coach with a short stop at Shepparton by the lake, and passing over the Murray River by the bridge shared by road and rail at Tocumwal. This was an ideal place for a stop for the birdwatchers, and there were items of interest for naturalists in general. Beautiful River Red Gums (*Eucalyptus camaldulensis*) and a large peppercorn tree (*Schinus molle*) reputed to be the oldest planted along the Murray, were admired. Through northern Victoria the commonest eucalypts seen were Grey Box (*E. microcarpa*), and these were still dominant as we made our way to Finley, our overnight stop. An interesting note was made that in this part of N.S.W. Yellow Box (*E. melliodora*) often has the appearance of being gum-barked, because of the loss of box-type bark.

Daylight saving made it easy for some to visit the new historical museum at Finley, while others went to the lake to watch birds (including Eastern Swamp Hen, Black-faced Cuckoo-shrike and Crested Pigeon). Before breakfast next morning several keen enthusiasts returned to the lake to make tape recordings of the Reed Warbler and the calls of a surprising number of other birds; the splendid recording (by Rob Cross) being played later to the other members of the party.

The journey continued along Newell Highway, with Grey Box still prominent, and, towards Narrandera, plenty of Murray Pines (*Callitris columellaris*), sometimes known as White

Cypress Pines. We made our lunch stop among these native pines just south of Ardlethan, where the botanists put the time to good use finding and discussing the varied species of wildflowers. Still along the Newell Highway, passing through a large forest of Murray Pines, we became excited by a gorgeous display of Wyalong Wattle (*Acacia cardiophylla*) growing in profusion along both roadsides and blooming in masses across paddocks; known and loved as a garden specimen, this species has its main habitat in this area, and it was not surprising that we soon arrived in West Wyalong, but not before we had enjoyed a walk for quite some distance through this wonderful display of Nature. Many other beautiful flowering plants exist here, along with patches of ironbarks and mallee eucalypts.

We passed through Forbes, and on to Parkes for an overnight stop. There had been heavy and persistent rain, and district roads were flooded in parts, and a deep "lake" threatened to prevent our inspection of the Parkes Radio Observatory. This was a dip in the road with water foaming as it rushed through one flooded paddock to another, complete with "Warning" notice. One of our staunch helpful members, shoes and socks removed and trousers rolled high, was into it without hesitation, to test the depth. This convinced our otherwise cautious driver that all was well, and he safely took the bus through, with several stranded car passengers as extra load.

This Australian National Radio As-

tronomy Observatory is run by C.S.I.R.O., Division of Radio Physics, and is situated 15 miles from Parkes in the Alectown district, on a 400-acre site in the floor of a large valley chosen because of the protection of the surrounding hills from electrical interference. It is concerned with investigations into the structure and evolution of the universe. In a large visitors' display centre one hears a recorded commentary on the purpose, the workings, the performance and research achievements up-to-date. The 64-metre radio telescope is the largest in the Southern Hemisphere. A framed Group Achievement Award from N.A.S.A. to C.S.I.R.O. was in recognition of the valuable help given during four Apollo flights of the moon exploration programme.

Next stop was the old gold-mining town of Peak Hill at the site of the open-cut mines, which look almost terrifying in their size and depth. Perched far down on the shaft wall were about a dozen Blue Check domestic pigeons! Another stop was made to enjoy the native plants and bird life of the Dubbo National Arboretum, established many years ago by George Althofer and other enthusiasts, who planted and cared for species from many parts of Australia. There were many species of *Acacia*, *Eucalyptus*, *Grevillea*, *Hakea*, *Prostanthera*, masses of *Stypanandra glauca* and *Hardenbergia violacea*, *Calytrix tetragona* and *Diuris sulphurea*, and the remarkable *Hakea recurva*, a Western Australian species with very long, strong, rigid spines, as well as many other wildflowers. We were shocked to be told later that this area has been handed over by the N.S.W. Government to the Taronga Park zoo as open range for some of their animals (it is to be hoped, only their native species). Only a brief stop was made in the fine inland city of Dubbo.

Proceeding along the Oxley Highway few were prepared for the dramatic first glimpse of the Warrumbungles, the outline of which against the late afternoon sky of a lovely sunny day revealed the almost grotesque structure of this unique range of volcanic mountains. A stop was demanded, and the photographers really went into action. (Our attempt to reach a Flora Reserve four miles along a dirt road was defeated by a flooded creek flowing fast and deep across the road, with a tantalizing glimpse of massed wattle blooms beyond.) Arriving in Coonabarabran, the town nearest to the Warrumbungles and our base for the next week, we passed the new Coonabarabran High School, built at a cost of a million dollars, and there were other signs that this town will develop much further when more visitors know about the tourist attractions of the ranges.

The next day we found that because of the unusually great rain, flooding of the access roads was inevitable, and we were temporarily unable to travel into the National Park. Club President, Peter Kelly, who had travelled with his family in his own car, reached Coonabarabran a day before we did, and suggested that we should go out along the Baradine Road, where wildflowers were plentiful. *Hardenbergia violacea* in large masses of bright purple was the first to catch the eye at the roadside, with pink *Boronia ledifolia* and *B. glabra*, both very plentiful, *Xanthorrhoea australis* in flower, *Brachyloma daphnoides*, *Caladenia carnea* and *C. caerulea*, *Diuris sulphurea*, *Grevillea floribunda*, *Hovea lanceolata*, *Daviesia latifolia*, *Acacia cardiophylla*, *A. spectabilis* (Mudgee Wattle), *A. cultriformis* (Knife-blade Wattle), *A. gladiiformis* (Sword Wattle), *Indigofera australis* var. *signata*, *Ricinoscarpos bowmanii* (Pink

Wedding Bush, very different from the Victorian Wedding Bush), *Dampiera lanceolata* and *Callitris endlicheri* (Black Cypress Pine). Later we moved to the Narrabri road, where again was seen a wonderful show of species already listed, in glorious display of colourful flowers. Still most conspicuous was the rich purple of False Sarsaparilla or Purple Coral Pea, in such large clumps climbing trees and over shrubs, showier than any of us had seen it before — what a good wet season can do! Eucalypts noted included *E. crebra* (Narrow-leaf Ironbark), *E. rossii* (White Gum, also known as Scribbly Gum, because when the old red-tinted bark of these lovely trees falls away the new bark is white with scribbly markings) and *E. blakelyi* (Blakely's Red Gum). *Angophora floribunda* (Rough-barked Apple-gum) was also noticed.

Our second day in Coonabarabran, and still unable to go into the Warrumbungle National Park, it was decided to make a visit to the Sandstone Caves, again led by Peter Kelly. The caves are located a short way in from the Narrabri road, and the walk along a track rich with wildflowers was most enjoyable. Puffballs up to five inches in diameter resembling cattle dung were quite common on this trail. Among the plants observed were *Prostanthera saxicola* (Rock Mint-bush), *Pimelea curviflora*, *Hybanthus monopetalus*, much more of the most attractive Pink Wedding Bush, *Boronia ledifolia* and *B. glabra*, Bloodwoods, native pines and *Macrozamia* sp. (the last-named quite stunted).

The sandstone caves are deeply gouged out caverns in a large outcrop of sandstone in intriguing forms and patterns, and showing almost brilliant colours. They would make a splendid shelter for wallabies and other animals. Young members enjoyed passing through a "tunnel" from one cave

to the next. Added to our plant list here were *Leptospermum trivalve*, *Olearia microphylla*, *Cryptandra amara*, *Melichrus urceolatus* (Urn Heath), *Cheilanthes tenuifolia*, *Bursaria spinosa*, *Acrotriche rigida*, *Dampiera* sp. and Blanket Fern. A Purple-backed Wren was seen, and a Wedge-tailed Eagle was watched soaring.

The afternoon was spent fossicking for gemstones (opals, black jasper) and petrified wood at Tooraweenah, near the junction of the Mendooran road with Oxley Highway, but this was a rather fruitless search, only a few small specimens of good quality jasper and some petrified wood being found. At night a few members of the party joined a group from the New England University (on nature and art courses in the Warrumbungles) at a lecture in Coonabarabran Shire Hall by Professor John Le Gay Brereton on zero population growth.

The next day, 30 August, the floodwaters had receded sufficiently to allow our vehicle into the Warrumbungle National Park. The Warrumbungle Range rises very abruptly and ruggedly from otherwise featureless plains (except that it is linked to the south-east with the Liverpool Range, an outlier of the Great Dividing Range). It supports flora and fauna from both the dry western plains and the moist east coast. Geologically intensely interesting, it is an ancient volcanic centre, active 13 million years ago, and what we see now are great dramatic spires and domes of trachyte. Volcanic features from within the Park include dykes in vertical sheets of igneous rocks exposed by erosion. One spectacular example is a high natural wall (300 feet) only 10 feet thick known as the Breadknife (an irresistible challenge to climbers until a ban was imposed to protect this unique feature for all

time) — it is a powerful magnet for all fit walkers. Other impressive volcanic plugs are Beloungery Spire and Crater Bluff. Wind and weather have eroded away most of the surrounding cones, leaving these solid plugs as mighty vertical pillars towering high towards the sky. Crater Bluff, Needle Mountain, Tonduron Spire and others are all cones of old volcanoes.

From Camp Pincham (the Park headquarters — Ranger, information centre, kiosk, camp facilities), we took a short walk that was confined to the immediate precincts, as Wombelong Creek, wide and fast-flowing, prevented our going further afield. Here we sighted Maidenhair Fern (*Adiantum aethiopicum*) for the first time on this trip, Blanket Fern (*Pleurosorus subglandulosus*), *Pimelea petraea*, Tree Violet (*Hymenanthera dentata*), *Eucalyptus blakelyi* and *E. camaldulensis*, *Acacia buxifolia* and *A. armata*, *A. cultriformis*, *Pimelea microcephala* and fine specimens of River Oak (*Casuarina cunninghamiana*). We were delighted to see Red Kangaroos here. Lunch was taken under Split Rock, after having moved on to Canyon Camp.

A good walk of two-and-a-half miles followed, during which were noted Sydney Golden Wattle (*Acacia cunninghamii*), Golden Everlasting (*Helichrysum bracteatum*), *Homoranthus flavescens* (with its strange green flowers in clumps), Austral Bear's-ear (*Cymbonotus lawsonianus*), *Podolepis longipedata*, *Acacia dealbata*, Kurrajong (*Brachychiton populneus*), Blunt Greenhood (*Pterostylis curta*), known as Green Goblins in N.S.W., Drooping Cassinia (*Cassinia arcuata*), *Grevillea ramosissima*, *Bertya gummiifera* (with male and female flowers on same bush, and greenish berries ripening at top of stem first), masses of *Pultenaea foliosa*, *Indigofera australis* var. *signata*, again the

magnificent *Hardenbergia violacea*, *Eucalyptus rossii* (dominant), Five-corners (*Styphelia triflora*), Wedge-leaf Hop-bush (*Dodonaea cuneata*) and Ruby Urn-heath (*Melichrus erubescens*). All of these shrubs and lowly plants, and more, were in flower, aided in their striking beauty by the rocky ravines, sheer cliffs of rock and fast-running streams.

On Friday, 31 August, our second day in the park, the main object was to do some mountain climbing, to the Breadknife and the High Tops, and it proved to be just as invigorating and strenuous as expected. We went by way of the Pincham Trail, on which everything has been done to make walking and climbing as easy as possible by well-defined wide pathways. Spirey Creek was running very fast, wide and deep in some parts, shallower in other places, and it was at these places that the path made frequent crossings of the creek by means of stepping stones or logs bridged between banks. Negotiating some of them was rather disconcerting to some of the female members; but never worry, for here the intrepid male members, perhaps again shoes and socks off and trousers rolled up, gave a helping hand to those who feared what could have been a good wetting. All was well, and fortunately the higher we climbed the narrower and shallower the creek became. Between crossings there was plenty to be seen — kangaroos, a few koalas, and birds everywhere. (This report makes little mention of the bird life, as a full bird list for the various places visited throughout the trip, compiled by Dorothy Dawson, will be printed at a later date.) Among the trees and shrubs were a group of Grass Trees (*Xanthorrhoea australis*) in flower, *Acacia caesiella* (a wattle new to us, which varies in size from a small shrub to a small tree, has l-veined

phyllodes, abruptly hooked at the tip, and covered with a very fine, bluish-white pubescence), *Asterolasia hexapetala*, *Correa reflexa*, *Clematis microphylla* and *C. glycinoides*, *Exocarpos cupressiformis*, Showy Violet (*Viola betonicifolia*), Common Everlasting (*Helichrysum apiculatum*) and Snow Gum (*Eucalyptus pauciflora*).

At Spirey View Lookout some good specimens of orchids were found: *Caladenia patersonii*, *Thelymitra aristata*, *Acianthus reniformis* and *Pterostylis mutica*. There was a lovely show of *Phebalium ralstonii* and Darling Pea (*Swainsona galegifolia*), also *S. oroboides*, and masses of *Dillwynia retorta*. *Actinotus forsythii* was noticed, but it was not in flower, *Pultenaea spinosa* and *Hovea longifolia*. After stiff climbing most stopped at a lookout point (Sreng Bos) for a breather and photographs (there are seats of logs and stones, with a view up left to Beloungery Spire and to the Breadknife up right). The climb from there on was through native pines, cherry ballart and eucalypts, past the Dagda Gap turn-off, up to Lugh's Gap hut (one of the many names from Celtic mythology given to features in the national park). Close up, The Breadknife was most impressive; after resting there at its base, there was a further climb to the Grand High Tops to reach an extensive view. We wondered whether the two trees standing silhouetted on the summit of The Breadknife were Kurrajongs or native pines. On the return walk, some clambered over a rocky scree to have a closer look at a Rusty Fig (*Ficus rubiginosa*), one of the few survivors of an earlier rain forest vegetation when the climate was much wetter. A big Grey Kangaroo stopped as though petrified, not knowing in which direction to leap away, with people on the track above and below. Later, from the bus on the way out of

the park, several groups of wallabies were watched, including a mother with her joey, in grassy paddocks and along a creek. Most members of the party arrived back in Coonabarabran more than ready for a hearty meal; after which some visited the Shire Hall for the exhibition of paintings done in the Warrumbungles by members of the University of New England courses who had joined the art group rather than those for geology or botany. It was a pleasure to meet again Veronica Parry, the American researcher on the behaviour of kookaburras (who gave a talk on them to the F.N.C.V. before her successful book on these birds was published); now married to an Australian, and lecturing on ecology at that university.

Saturday, 1 September was our third and last day in the Warrumbungles. Again favoured by beautiful weather, we paid a visit to Quinlan's Lookout, where one takes in a wonderful view of the whole volcanic system. The highest peak, now called Mt. Exmouth (formerly Wambelong), is 3,954 feet above sea level, but the flooded road leading to the track up, and the delay in reaching the park, meant we were unable to visit this key point of the Warrumbungles. (The peak named Mt. Exmouth by Oxley in 1818 is the most westerly height, now known as Mt. Bullaway; he named the mountains "Arbuthnot's Range", later superseded by the aboriginal word Warrumbungle, said by some to mean small mountain, and by others crooked mountain.) Crater Bluff, Bluff Mountain and Bluff Pyramid are separate features, as are Beloungery Spire and Beloungery Split Rock. Siding Spring Mountain stands out because of the silvery (40-inch) telescope building on its summit. The 150-inch telescope now being erected will be the largest in the Southern Hemisphere. Tonduron Spire is the

most southerly feature, and Timor Rock the most easterly.

At Quinlan's Gap we were delighted to see a forest of Tree Hovea (*Hovea lanceolata*), White Box (*Eucalyptus albens*) and Mountain Grey Gum (*E. cypellocarpa*, called Spotted Mountain Gum in N.S.W.). *Daviesia ulicifolia* was also seen.

We moved out of the ranges and up the road into the Pilliga Scrub, dense with trees and shrubs. This is a huge area, but the part we entered was dominated by Angophoras, with much *Acacia spectabilis* and *A. gladiiformis*. One member reported seeing a Blue-faced Honeyeater feeding young at nest. Other plant species noted included *Acacia decora*, *Isopogon petiolaris*, *Hibbertia stricta*, Silky Geebung (*Persoonia sericea*), *Leucopogon attenuatus*, *Acacia polybotrya* and a trailing Goodenia. One plant that puzzled us was later identified as a species of *Philotheca*, a genus not found in Victoria. In other parts of the Pilliga Scrub the dominants are *Callitris* and *Casuarina*.

Sunday, 2 September we set out for Wellington by a different route, passing through Mendooran and Goonoo State Forest. Again a few exciting roadside stops, lured by the dense bush and vibrant colours. Some plants not yet listed were added here, such as *Cassia nemophila*, a prostrate *Wahlenbergia*, Turkey Bush (*Myoporum deserti*), *Eriostemon myoporoides* and a lovely *Phebalium stenophyllum* (plenty of it). There were also quantities of *Prostanthera rotundifolium*, *Indigofera australis* var. *signata*, Purple Dampiera, *Acacia spectabilis* (lining both sides of the road), *Eucalyptus crebra* and native pines. It was enjoyable to walk into a large stand of Spur-wing Wattle (*Acacia triptera*), in spite of its rigid, prickly nature; so far as is known, this occurs in Victoria only in the Warby Ranges, and

only a few specimens at that. A species of *Phyllanthus* and *Grevillea triternata* were also seen. We passed through Dubbo, and proceeded along the Mitchell Highway to Wellington, reaching there in mid-afternoon, in time for a quick visit to Wellington Caves.

These are fossil caves, and important because they were discovered in 1830 when Sir Thomas Mitchell, surveyor-general, made a collection of fossil bones, which he sent to Professor Richard Owen at the Hunterian Museum, London. Owen, after studying the bones, published the first report of the extinct marsupial fauna of Australia—the first systematic description and illustrations of the *Diprotodon australis*, the earliest figure of the characteristic pre-molar tooth of the Marsupial Lion (*Thylacoleo carnifex*), and also a record of the fact that the Thylacine or Tasmanian Wolf (*Thylacinus cynocephalus*) previously existed on the mainland. (Much later the first full skeleton of *Diprotodon* was found at Lake Callabonna, South Australia.) The animals have been preserved in red earth deposits of limestone coloured with oxide of iron. Mitchell's Cave is no longer open to the general public, but the Cathedral and Gaden Caves are. A nearby enclosure (alongside a large aviary) is almost entirely covered with docks, horehound and nettles—hardly a natural environment for the kangaroos and wallabies it contains!

Next morning, 3 September, after having a look at the Bell River near its junction with the Macquarie (it was in high flood recently), we met by arrangement, Mr. George Althofer (formerly of "Nindethana" native plants nursery at Dripstone, but who now lives in Wellington). He and his brother and other helpers have since 1964 planted in the Burrendong Arboretum, near the shores of the lake

formed by the Burrendong Dam at the junction of the Cudgegong River with the Macquarie, 34,000 native plants from many parts of Australia (including 12,000 N.S.W. plants). It was remarkable to see in one area no fewer than 200 species of *Acacia*, 90 species of *Hakea*, and 45 species of *Prostanthera*. (*P. cruciflora* was recently described as a new species by J. H. Willis, the specific name being suggested by Mr. Althofer.) The many *Grevillea* species are not so close together, as they need a variety of micro-habitats.

One of the most interesting plants shown to us was *Kennedia retrorsa*, which, lost to science for over 100 years, was rediscovered in the Widden district and is now doing well here. George and Peter Althofer were pleased when a number of the F.N.C.V. visitors, during lunch at the picnic ground beside the lake, paid subscriptions to join the Burrendong Arboretum Association as an encouragement of a job well done. There has been much discouragement, as the N.S.W. Government originally proclaimed a Burrendong National Park and then revoked it, and the Althofers and others had fought for two years a proposal to construct a road (for more direct access to the National Fitness Camp on the lake shore) right through the planted area of the Arboretum — it is good to know that a decision has now been made not to proceed with this damaging scheme. Brown Tree-creepers, White-winged Trillers and Hooded Robins had added to the interest here; but we indulged a different kind of interest during an afternoon visit to the historic old gold-mining town, Stuart Town, almost, but not quite, a ghost town. It was at one time known as Ironbark, and is enshrined in the well-known poem by Banjo Paterson, "The Man from Ironbark". We pressed on, through

Euchareena (where Bosches Creek Flora Reserve has just been established) and on to Orange for a brief stop in the public gardens, and on to the historic city of Bathurst.

We had time to inspect the faithfully and proudly preserved humble home of former Prime Minister Ben Chifley, the monument to the discovery by Evans of the Bathurst Plains, and the plaque in Caddy Park commemorating the terminal point of the only inland journey made by Charles Darwin during his visit to Sydney in January, 1836.

Tuesday, 4 September, was spent travelling to Canberra via Cowra, where a visit was paid to the War Memorial Cemetery, where Australians and Japanese lie in adjacent areas . . . a reminder of the fanatical "break-out" of soldiers and airmen from the P.O.W. camp there. Many Japanese tourists visit this place. Lunch was taken at Boorowa, beside the swimming pool and park, then the coach took us on through Yass into the Australian Capital Territory, arriving in Canberra in time to drive up the slopes (still clothed with wild-flowers and native trees) of Mount Ainslie. From the lookout on the summit a splendid view of the layout of the city and suburbs is obtained, including the War Memorial Museum and the unique All Saints' Church, both of which were also visited.

The following day we went out via Mt. Stromlo and Casuarina Sands, with views of snow on the Brindabella Ranges, past the tracking station of the Tidbinbilla Deep Space Communication Project, and into Tidbinbilla Nature Reserve, which with its wonderful plans for the conservation of fauna and flora is very impressive. Since its beginning in 1936 the reserve has been extended to an area of 13,620 acres, so it now covers the whole of the Upper Tidbinbilla Val-

ley. Brushtail and Ringtail Possums, Greater, Sugar and Pigmy Gliders and Swamp Wallabies are known to exist here. But it has been necessary to re-introduce Emus, Red and Grey Kangaroos and Koalas (kept in large fenced areas). Wombats, Spiny Ant-eaters, Grey Kangaroos and Red-necked Wallabies graze in the open grassy parts in early morning and evening. In the fern gullies the Superb Lyrebird may be seen and heard. Water birds are protected by fenced enclosures, happy with their lagoon and natural habitat.

There is much of geological interest too within the reserve, but, quite rightly, no hammering or disturbance of rocks is allowed. The Tidbinbilla area was covered by shallow seas about 450-500 million years ago (Ordovician period), but was lifted by volcanic action above sea level to form land. Further volcanic eruptions, glaciers and earthquakes, and processes of erosion, have given us what we have today. This is only a small part of the full story (folders are available in the information centre about the geology, the nature trails, and the general data on the park, and we also heard a recorded commentary, illustrated by colour slides, on the bird life). Native trees and flowers all abound here, and the areas formerly devoted to cattle and sheep-raising are being brought back as far as possible to their pristine appearance.

Canberra Botanic Gardens was the venue for the afternoon. These gardens are entirely devoted to native Australian species, from all States, and the lower slopes of Black Mountain have been transformed, even to the remarkable achievement of converting a watercourse of dry sclerophyll vegetation into a moist rain-forest environment to enable the growing of subtropical and even tropical species of shrubs, orchids and

ferns; this is done by a piped misting system that regularly and automatically showers the plants with the moisture essential to their survival. Walter Burley Griffin's original plan for the gardens was to establish them near the lake, with representation of the world's flora on a continental subdivision basis, but the present gardens are a great improvement on that concept. There is a herbarium and a new botany building, and it is to be hoped that a new up-dated "Flora Australiensis" may eventually result from work done by Canberra botanists. The information centre, adjoining the herbarium, is playing a worthy educational role, set up to be helpful where and whenever needed, including school visits.

On Thursday, 6 September, before leaving Canberra, a visit was paid to historic St. John's Church, built by Robert Campbell of Duntroon, in the grounds of which lies buried Viscount Dunrossil, a former Governor-General. Of special interest to naturalists was a tablet in the church to the memory of Robin John Tillyard, the famous entomologist whose book, "Insects of Australia and New Zealand", was the standard text until the C.S.I.R.O. published "Insects of Australia" in more recent years. The journey back to Melbourne, via North Albury (where an overnight stop was made) is too well-known to require any description, but a short visit was made to the War Memorial hill-top at Albury to view the extent of the flooded Murray River, the course of which was hardly distinguishable because of the formation of the vast temporary "lake". Despite a flooded access road, a number got wet feet walking over to the "Hovell Tree", a River Red Gum inscribed by William Hilton Hovell on 17 November, 1824 — Hume Inn opposite completes the duo, Hume and Hovell.

Readers' Nature Notes

Mrs. Ellen Lyndon of Leongatha in Victoria has sent these notes on fungi.

Some Fungi Notes

The mild and moist conditions of late spring, 1973, stimulated the fruiting of some of the larger fungi. In the middle of November some fine specimens of the Fly Agaric were noticed under conifers at Koonwarra. Perhaps this *Amanita* pops up whenever conditions are right for it. Mr. R. D. Lee, writing in the *Victorian Naturalist* of April, 1961, recorded these toadstools in hundreds at Shoreham, as late as 10 December.

On 17 November, at Bear Gully near Cape Liptrap, we found many large clumps of *Pleurotus nidiformis* sprouting from the butts of dead and dying Coast Banksias (*B. integrifolia*). A cluster of these luminous toadstools was collected for later inspection in the darkroom. Half a dozen medium-sized fungi, branching from a common base, provided a useful torch. Their illumination was sufficient for us to distinguish objects in the room and to recognise pictures on the walls. Perhaps someone can tell us if our Ghost Fungus is confined to Australia? I can find no mention of luminous properties among the *Pleurotus* of other lands, although America seems to have a *Clitocybe* that warrants the common name of "Jack-o-Lantern Fungus".

Up on the Bogong High Plains, on 26/27 January, 1974, on snow plains unaffected by heat or drought this summer, the handsome red and black Stinkhorn, or Starfish Fungus (*Aseroë rubra*), was much admired and photographed. Its namesake odour is not apparent in the open air; the plant needs to be hatched from the egg stage in a confined space like a tent

to derive the full benefit from its flavour. Our party saw at least six of them, some at each stopping place, which indicates that this is a very good year for *Aseroë*, for we must have missed many more. They were robust specimens, loaded with several species of flies, so that much of the malodorous spore-bearing mucus was removed by early afternoon. The curling red arms varied in numbers from six to eight pairs.

Again the question arises. Are our strange and beautiful Stinkhorns confined to Australia? Lilian Hawker in "Fungi" partly answers this question. She mentions a few species that occur occasionally in Britain that were probably introduced with the soil on plants imported from the Southern Hemisphere, naming *Clathrus*, *Aseroë* and *Dictyophora*. Can anyone add to that?

More on Caper Whites

Dr. Eric Sims of Adelaide, South Australia, makes some comments on an earlier note published in these columns.

Jean Galbraith's note in the *Victorian Naturalist* 90 (1974) about the numerous Caper White butterflies (*Anaphaeis java teutonia*) that were seen in the Warby Ranges and at Power's Lookout in October 1973, prompts me to report that my wife and I saw this species, in larval, pupal, and adult stages, in considerable numbers on 18 November 1973 whilst motoring from Hay to West Wyalong in New South Wales. The larvae and pupae were using *Apophyllum anomalum* as their host tree. This is a small tree with almost leafless branches rather resembling *Exocarpos*

aphyllus, although not so intricately twiggy as the latter, and not, of course, botanically related to it. According to Anderson (1968) and the *Australian Encyclopaedia* (1965) *A. anomalum* is variously known as "currant bush", "warrior bush", or "mustard bush". It is widely distributed throughout the Western Plains of New South Wales, as defined in the map in Anderson's book, and is one of the genera of the family *Capparidaceae* so it presumably is as suitable a host tree for the Caper White larvae as are the various species of *Capparis*, the genus in our arid inland that is the usual favourite.

Some of the *Apophyllums* were in flower so we were able to appreciate that they are dioecious, the fragrant little yellow flowers of the female trees manifesting the stalked ovaries (gynophores) typical of the family. After we had realised that the trees were heavily infested with the butterfly larvae, we then became more keenly aware as we drove on that virtually every *Apophyllum* tree we subsequently saw for many miles had a halo of adult Caper Whites fluttering around them, indicating a very healthy "birth-rate".

As Jean Galbraith points out, it is curious that Caper White butterflies migrate in such large numbers to areas where there are likely to be no suitable host trees for their eggs and larvae. However, our observation suggests that the butterfly may be able to use other genera within the family *Capparidaceae* for these purposes. Various genera of this family, like some other related families in the same botanical Order such as *Cruciferae* (*Brassicaceae*) and *Resedaceae* (the mignonette family), produce mustard oil glycosides in their metabolism. This presumably explains one of the popular names of *Apophyllum anomalum*, and also suggests that the

Caper White favours this family because its larvae can tolerate these substances. Moreover, any such chemical substances that the larvae ingest are likely to remain in the adult butterfly after metamorphosis, thus rendering it unpalatable to predators (Brower, 1969), which obviously would have survival value for the species. Indeed, one therefore suspects that the Caper White could, if necessary, use various crucifers and mignonettes, which produce similar mustard oils, as hosts if necessary. In this regard it is perhaps significant that the cabbage white butterfly (*Pieris rapae*) which is in the same family (*Pieridae*) as the Caper White, does use these host plants, whilst another northern butterfly of the same family, the Chalk White (*Elodina parthia*) is also adapted to trees of the *Capparis* genus (McCubbin, 1971).

However, I assume that if Caper White larvae had ever been found on plants of these other botanical families, the fact would be well documented by now, but certainly our observation would suggest that the Caper White is not confined to just the genus *Capparis*.

Incidentally, the *Australian Encyclopaedia* states that there are six genera of the family *Capparidaceae*, comprising 35 species, indigenous to Australia, even including some native cleomes, so the Caper White could have quite a choice if it did not fancy a crucifer! Nevertheless, in Adelaide we have seen their larvae only on the large specimen of *Capparis mitchelli* in our Botanic Gardens on North Terrace.

The writer would be interested to hear of other readers' observations, and would also be very interested to know if the Caper White appears to be unpalatable to most birds because

continued on page 137

The Origin of Generic Names of the Victorian Flora

Part 2—Latin, Greek and Miscellaneous

[continued from 91 (4)]

by JAMES A. BAINES.

Athyrium. Gk *athyros*, without door, open (a-, without; thyreos, door, shield), the indusium at first covering sorus like a pointed hood, then lacerated and remaining attached only at base of sorus. Name species for Athyriaceae. One of our native species is Austral Lady-fern, and the other *A. japonicum*, Japanese Lady-fern (because named by Thunberg from Japan) is just as indigenous.

Atriplex. The Gk name for Orach, a herb that can be used like spinach but is usually regarded as a weed, was *atraxaxys*, which in Lat became *atriplex*, which at first sight looks like 'black plaits'. Orach, **A. hortensis*, is sometimes spelt *orache*, as it came into English through Italian then French, but basically it is the same word as the original Greek one. In any case, dark hair would be inappropriate for Old Man Saltbush, *A. nummularia*! Victoria has 21 native species and three introduced species.

Australina. Lat *australis*, southern, doubtless applied because this Forest or Shade Nettle was an antipodean member of the family Urticaceae. Our common species, *A. muelleri*, one of many plants commemorating Baron von Mueller, is sometimes called Smooth Nettle because it lacks the barbs of the introduced Stinging Nettle.

***Avena.** The classical Lat name for the oat. Victoria has five introduced species.

***Axonopus.** Gk *axon*, axle; *pous*, foot. The tropical American species,

A. affinis, appears in lawns from time to time, being known as Carpet Grass.

Azolla. Gk *azo*, to dry; *olluo*, to kill; in allusion to the fact that these aquatic plants live in water and succumb when away from this element. The common names of our two species, Ferny Azolla and Red Azolla, constitute an excellent example of a generic name appropriately used in this way.

***Ballota.** The Gk name for Black Horehound, **B. nigra*, which is localized in Victoria only at Williamstown. The Gk name, *ballote*, probably came from the verb *ballo*, to emit.

Barbarea. Named after St. Barbara, patron saint of artillerymen and miners, the Yellow Rocket, *B. vulgaris*, having once been known as Herb of St. Barbara. Our only species is native, *B. australis*, Austral Wintercress.

Batrachium. Gk *batrachos*, a frog. *B. trichophyllum* is correctly named *Ranunculus trichophyllus*, Water Buttercup, as *Batrachium* has been lowered to sub-generic rank under *Ranunculus* (which means 'little frog').

***Bellis.** Lat *bellus*, pretty. English Daisy, **B. perennis*, is the common daisy that covers many of our lawns with its dainty flowers. Daisy is the day's eye, i.e. the sun, which it resembles. The famous woman spy, Mata Hari, bore a Malay name that has the same origin: *mata*, eye; *hari*, day; *mata hari*, the sun.

***Berberis.** Medieval Lat *berberis* or *barbaris*, classical Lat *barbarus*, foreign, ultimately from *Barbar*, the Arabic name for the Berber race of North African people (who are of course no longer 'barbarians'). Smith and Stearn state that the Arabs also used the term for the fruit, known as *Barberry* in English, a word first appearing in the language in 1533, although O.E.D. quotes 1440 for a Scots recording of *Berber* as the name of the fruit. Our species, naturalized in the Dandenongs, is **A. darwinii*.

***Beta.** The classical Lat name for **B. vulgaris*, the Wild Beet growing on parts of the Victorian coast being subspecies *maritima*. Red Beet, Sugar Beet, and Swiss Chard are varieties of the same species.

Bidens. Lat *bis*, twice; *dens*, a tooth; in reference to the two teeth on the so-called seed which is really the cypsela or dry one-seeded fruit. Called Tickseed, Beggar's Ticks, Stick-tight

or Bur-marigold, our native species, *B. tripartita* (literally 3-part 2-tooth) is the Erect Bur-marigold.

Blechnum. Gk *blechnon*, the classical name for a fern, probably not this one. Victoria has 8 native species of *Blechnum*, which gives its name to the family *Blechnaceae*. Most of them are known as Water-ferns, but one, *B. cartilagineum*, inspired the obvious common name of Gristle Fern.

Blennodia. Gk *blennodes*, slimy (*blennos*, slime or mucus), alluding to the fibrous mucus that exudes from the testa of the seeds when soaked. Our species previously in *Blennodia* are now in several genera: *Arabidella*, *Drabastrum*, *Harmsiodoxa* and *Pachymitus*, mainly as a result of 'splitting' in 1924 by O. E. Schulz. The 7th edition of 'A Dictionary of the Flowering Plants and Ferns', by J. C. Willis, retains *Blennodia* as a valid genus of 15 Australian species; this was published in 1966.

to be continued

Readers' Nature Notes (continued)

of its presumed content of mustard oils. A. B. Rose (1973) did find the remains of a Caper White in the crop of a willie wagtail (*Rhipidura leucophrys*) in New South Wales in November 1968, but perhaps other

observers have noticed other birds enjoying the feast during one of the periodic migrations of these butterflies to the Eastern Coast from their breeding grounds west of the Main Divide?

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reptiles of victoria - 12

by HANS BESTE

Plate 23

Denisonia superba — Copperhead Snake

A robust, poisonous species, growing to at least five feet.

Length: There are two forms in this State, the largest one growing to five feet.

This species, which can be dangerous to man, is dark brown to black dorsally, with the scales being rather dull in appearance. Young specimens often have light coloured scales, which are quite distinct, around the mouth. The under or ventral surface can be pale greenish to fawn or orange. There is usually some orange wash on the lateral surface, blending in gradually with the back and belly of the snake.

Habitat: grassland and forest country from alpine to coastal areas.

Best distinguishing features: from other large snakes in Vic.: 15 mid-body scales (single anal and sub-caudal scales).

Plate 24

Delma impar — Spinifex Snake Lizard

A snake-like lizard, which is seldom seen due to its secretive habits.

Length: to about twelve inches.

Similar to *Delma frazeri* in appearance, but has blunter snout and more rounded head. General colouration putty-grey, often marked with vertical black stripes, on whitish background, behind ear opening. Rudimentary hind leg (flat scale—movable) present.

Habitat: usually hiding in *Triodea* sp. bushes (err. called porcupine grass) in mallee type habitat.

Best distinguishing features: shape, markings, but best by head shields.



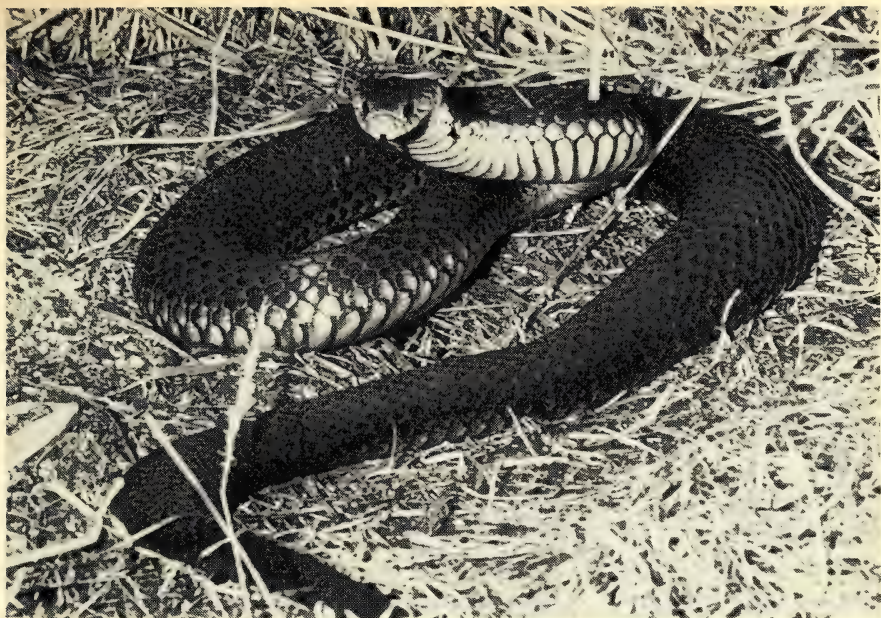


Plate 23



Plate 24

The Blue Wren Saga

The following are extracts from letters written by Miss N. T. Rossiter for a friend in hospital. (The bold sub-heads have been added by the editor.) The account of the blue wrens seemed far too fascinating to be confined to personal letters and I asked her permission to send it to the *Victorian Naturalist*. Miss Rossiter has since drawn the sketch map showing location of the various nests.

Miss Rossiter lives in the country on the eastern slopes of the Warby Ranges eight miles south of Wangaratta. As well as being a keen and systematic bird observer, she is an ardent grower of Australian plants and the *Hardenbergias* mentioned in her letter are a wonderful show in the spring. The house "Nakkala" (aboriginal for "facing east") has superb views to Mt. Buffalo, and is placed on the only extensive flat area in her two-acre block; from a few feet in front of the house the land falls at about 45° for several yards, then slopes more gently to a dam about 75 yards distant.

On 23 December, 1973 Miss Rossiter wrote:

I shall now relate the blue wren saga. I shall not start at the beginning, which was in October, 1972 when two blue birds and one brown built their first nest at "Nakkala" in the creeper just outside the kitchen window.

I shall start at the end of August, 1973 when the tally was three males (blue) and one female.

First nest — two fledglings

A nest was built in the *Hardenbergia* (Purple Coral-pea) on the front bank, and two fledglings came out of the nest on 25 September. A week after this, I saw the female finishing another nest in another *Hardenbergia*. At this stage there were six birds — three males, one female, two fledglings.

Second nest — three fledglings

On 5 November three fledglings came out of the second nest (nine birds in all). At some stage between the first and second fledgling appearance, I discovered there were now only two blue birds but one more adult brown; presumably one of the males had reverted to his immature plumage as they do every year for the first three years. I now found it extremely difficult to count and be sure there were still seven brown birds around.

Third nest — three fledglings

On 2 December I found a third nest in yet another *Hardenbergia* with young birds in it. These were out of the nest (three fledglings) on 9 December (total 12 birds). It is impossible to count 10 brown birds all at once, but the two blues are still about.

Fourth nest — three eggs

On 20 December I found a fourth nest, in a *Hakea* this time, and there were three eggs in it. In the storm on Friday, 21 December this nest was partially dislodged and one egg lost. I don't know whether the parent birds have gone back to it, but I rather think it will be deserted as the side opening has now become a top opening.

The interesting points in this story are that there is only one breeding female (as even the oldest fledgling would be only three months old — three blues and one brown at end of August); and the fact that four nests were built in four months. I am keeping notes because I could never remember or

keep up with their dizzy reproduction rate.

It will be interesting to see if another breeding female crops up, but I rather doubt if a second breeding pair would be allowed in this territory. The theory is that as soon as the female hatches out the young, she leaves the feeding of them to the brothers, sisters, uncles and aunts; and she and her mate start another family.

In a letter of 30 December Miss Rossiter wrote:

I have been thinking about the blue wrens' breeding capacity, and another possibility has occurred to me. Although I know there was only one female at the end of August, by the time the second lot of fledglings were indistinguishable from the adult female and there were too many brown birds to be sure of a total count, it is possible that one of the males brought in another breeding female from outside. But, until I can find two nests with eggs or young in each, I have to assume that one breeding pair is producing all the fledglings.

Continuing the story from where I left off, I looked at the dislodged nest after posting my last letter to you and found it had disintegrated and the other two eggs fallen out. That was on 23 December.

Fifth nest — three eggs

On Thursday, 27 December I found another nest in a Daisy-bush. I put my finger in and could not feel anything, but the next day I could feel two eggs; and on the following day three eggs.

I have not seen any birds about the nest at all, but all day yesterday the two males and four or five browns have been very active about the creeper on the trellis outside the kitchen window. Working on the idea

that there might be another breeding female, I've looked in vain for any sign of another nest there, nor have I seen them taking any building material into it. I have also gone around the likely places looking for another nest, but with no luck so far. I usually find a nest by the excessive twittering that goes on if I happen to be getting near it, and as I move about the whole block every day I should be aware of any nests in use. I think there are no suitable nest sites outside the block for them to be frequenting my area so regularly.

On 6 January, 1974 Miss Rossiter wrote:

Several times, including today, I have seen the female sitting on the latest nest, since establishing (29 December, 1973) that there were three eggs in it laid between 27 and 29. I shall be interested to see how long they take to hatch.

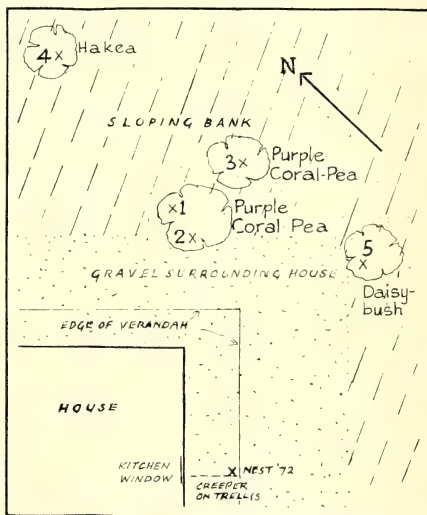


Figure 1

Plan showing location of nests about garden.

In spite of what I wrote in my last letter about one of the males possibly bringing in another female from outside, I'm reasonably sure this hasn't happened. Certainly, if two lots of fledglings were about at the same time I couldn't miss them because there is a terrific commotion among the family when the young birds first come out.

And from a letter of 13 January:

Three fledglings from fifth nest hatched in two weeks.

Well, the latest batch of blue wren chicks are out of the eggs, probably hatched on 11 January. I'm not absolutely sure of that date because I'm a bit squeamish of putting my finger in the nest where there may be young birds in case I hurt them (as well as just squeamishness).

I must keep watch for further nest-building activities because, now the young are out, the female may start again and I would like to know how soon after the "birth" she does this.

From a letter of 22 January:

The latest fledglings came out of the nest this morning, three weeks and three days after I counted the three eggs. I saw them still in the nest before I started on my daily plant inspection, but as I was returning from the dam bank, I heard a terrible commotion on the bank in front of the house and saw a flurry of little birds. I thought—"those sparrows are after my wrens", and hastened to protect them, but instead found the three infants were out and about.

They are comical-looking little things. Their tails stick up like an adult wren's but are only about an inch long; so at this stage they are easy to distinguish from the others as well as by their fluffiness and inexpert flight.

I don't think the breeding female has started another nest yet, but I'll keep a sharp lookout now for signs of the pair mating or for the female carrying building material.

M.J.L.

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Nature Notes from the Gold Coast

by ALEX. N. BURNS.

December

With the coming of summer weather the White Spiders have become very active amongst the flowers of Buddleyia and Lantana, and many butterflies and other insects have been captured and eaten by them. Most noteworthy amongst the butterflies were the Blue Triangle (*Graphium sarpedon choredon* Feld.), the Pale Green Triangle (*Graphium eurypylus lycaon* West.), the White Nymph (*Mynes geoffroyi guerini* Wall.), the Regent Skipper (*Euschemon rafflesia rafflesia* Macl.), Orange Palmdart (*Cephenes augiades sperthias* Feld.), Green Awl (*Hasora discolor mastusia* Fruhs.) and the Australian Gull (*Cepora perimale scyllara* Macl.). Other insects caught included a large Robber Fly (Asilidae-Diptera) and the Bee Hover Fly (*Eristalis tenax* Diptera-Syrphidae).

Other active predators too have been observed; a large greyish Praying Mantis has taken up its abode on the Buddleyia, and to my astonishment its first noted victim was a fresh specimen (female) of the Monarch or Wanderer butterfly. These butterflies are regarded as being distasteful to birds and other predators, but the Mantis had eaten quite a large portion of the butterfly's thorax when observed.

On a small orange tree on which were larvae in various stages from very small to fully grown of the Orchard Swallow Tail Butterfly (*Papilio aegaeus aegaeus* Don.) one fully-grown larva was found impaled on the proboscis of a large Reduviid or Assassin Bug. Nearby on the same tree was a pupa of the same butterfly; this was being attacked by several

very small parasitic wasps belonging to the Family Chalcididae (order Hymenoptera). Apparently the Chalcids were effective in their work because the pupa turned black within a couple of days.

These records are still not all the observations related to creatures maintaining the "balance of Nature". One evening last week at dusk, a neighbour discovered on the road near our house, a large Carpet Snake estimated to be 9-10 feet in length, well and truly wrapped round one of the Scrub Turkeys. When observed, the Turkey was dead and its body in the process of being crushed into a condition suitable for swallowing. An appropriate time for such a nice meal — right on Christmas.

The large Nephila Spiders are becoming active in the rain forest and many large yellowish sticky webs are to be seen in open spaces and adjacent to the tracks. Strangely enough, although many webs came under observation, very few contained the remains of insects. Possibly these large spiders consume the whole of their victims, with exception of wings and other dry members of the body; even then only small pieces of insects' wings have been observed, and these appeared to be from Dragon Flies.

Young Scrub Turkeys are beginning to emerge from the nesting mounds; they are extremely active and can fend for themselves almost as soon as they leave the mound. One very large mound about 70 metres from our house should produce a large number of chicks, because no less than eight females have been observed on and near it.

The garden is very well stocked at present with young lizards of a number of species, mainly skinks, but also many young Blue-tongued of both the long- and short-tailed species. The latter are very pretty little creatures and show no signs of fear when approached; they can be picked up quite easily. Many young skinks come on to the concrete veranda, and some often enter the house where they find small insects that have been attracted to the lights. Brief but heavy rain showers are frequent at present, and it was interesting to observe that the lizards on the concrete dashed for cover under the ledge of the double doors. As soon as the rain stopped and the sun shone, they came out although the concrete was still very wet.

Currumbin Bird Sanctuary

Mr. Alex. Griffiths, who owns the Currumbin Bird Sanctuary, has just produced a very fine book with 56 colour plates, all dealing with the development of the Sanctuary since its commencement about 20 years ago. This fine publication sells for \$2.95, and should be of great interest, especially to bird lovers.

* * * *

Some weeks ago one of the Scrub Turkeys which come to be fed each late afternoon suffered a broken leg just below the knee joint; the injury however did not prevent the unfortunate bird from coming to be fed with the others. The leg has now healed, the lower portion having been removed, and the turkey seems little worse for its experience. It hops on one leg, and readily flies high into the "roosting trees". On account of its mobility being less than that of its fellows, it has learned to come to be

fed early each morning when it can feed undisturbed.

Last year a Currawong nested in a large gum tree across the road from the garden; the old nest still remained almost intact until now, but the birds decided to build another nest in the same tree only a few feet away from the old one. At the present time the bird is sitting and can be easily seen from the ground. This white barked gum tree is a great favourite with the Koalas, and several times weekly one or two will feed on it very much to the disgust of the Currawongs which attack the Koalas almost without letting up. Although the animals constantly shift positions they get no peace from the Currawongs. Fifty yards down the road from this tree is another large gum also much favoured by the Koalas. Each season Crows nest in this tree, and at present are active; they do not however appear to dislike the animals' presence so much as the Currawongs, but one can always be pretty sure when a bear is in the tree because the Crows keep up a persistent "carking" whilst it is there.

The advent of warmer weather is creating great activity amongst the local lizard population; many small skinks of several species are very plentiful, in fact sometimes one or two specimens will enter the house to pick up insects which have been attracted to lights. Several Frill-necked Lizards have taken up their positions on the road embankment; and in the garden both Long- and Short-tailed Blue-tongued Lizards are common. Two specimens camp under the house regularly. At the bend of the road two beautiful Land Mullet Lizards camp under a pile of debris. These beautiful large skinks have been familiar friends now for at least three years, during which time they have grown considerably.

Again, Congratulations to Jim Willis

The Council of Monash University has appointed Mr. Willis a Fellow of the Faculty of Science in recognition of his distinguished contributions to Australian Botany. He will be able to make what use he wishes of the facilities of the Botany Department, and take part in teaching, research and decision-making activities in the Faculty.

Field Naturalists Club of Victoria

General Meeting — 8 April

Guest speaker at the April meeting was Mr. Geoff Douglas of the Vermin and Noxious Weeds Destruction Board, who spoke on "Ecological Problems caused by Introduced Animals and Plants". Copies of the text of the talk were available at the meeting as a reprint of an article in the periodical "Victoria's Resources"; an appendage to the article is a very comprehensive set of references to the literature on the subject. Mr. Douglas gave an interesting insight into the far reaching problems associated with the thoughtless introduction of alien species, and showed a number of slides depicting various aspects of the Board's work.

The meeting agreed to support the nomination of Miss Ina Watson for the 1974 award of the Natural History Medallion. Miss Watson was recently elected an honorary member of the Club, having previously served at various times both as President, and Editor of "The Victorian Naturalist".

Mr. Ros Garnet announced that the Conservation Council of Victoria, of which the Club is a member body, had opened offices at 15 Drummond Street, Carlton. This had been made possible by the allocation to C.C.V. of a portion of a Commonwealth Grant made for the assistance of conservation bodies. Mr. Garnet said it was hoped that this grant would be renewed annually, and that the office, when fully established, would be able to offer many facilities to member bodies.

The Club library is once again open to members and the President expressed gratitude to Dr. Churchill, Director of the Herbarium, for making the present temporary arrangement possible.

The Treasurer, Mr. Harry Bishop, spoke briefly about the rising cost of printing "The Victorian Naturalist" and anticipated that an increase in Club fees would be inevitable.

The next meeting will be on Monday, 13th May, when Mr. Arthur Brook will speak on "A Day in the Life of a Frog".

Conservation Group

The first meeting of the Conservation Group was held at the Herbarium on Wednesday, 10 April. Seventeen members were present and the interim committee consisted of Mr. Barry Callanan, chairman, and Miss G. Piper, secretary. Mr. Callanan opened the meeting by speaking on the need to assemble the information which is available to, or held by club members. He pointed out that people concerned with conservation must have the courage to express their love for the wild things through action. It is necessary that the conservation group be a working group and not a lecture-entertainment one, and he hoped that the group will be centred about, and with individuals attached to, specific projects.

Mr. Ros Garnet reviewed the history of the F.N.C.V. in conservation. In the early years of the club the members included leading citizens, reports of meetings appeared in the "Age" and "Leader" and the experts in natural history in Victoria were members of the club. The *Victorian Naturalist* then contained much useful information and even nowadays these records are valuable to geologists and conchologists. The F.N.C.V. members took part in pressing for conservation of such areas as Fern-tree Gully, Wilson's Promontory, Mt. Buffalo, Tower Hill and Kinglake. Extensions to Wyperfeld were due to efforts

from members in opposition to locals who wanted the park eliminated.

He recommended that the F.N.C.V. could guide public opinion if it accumulated information from newspapers, went through Hansard and kept in close touch with governmental organisations such as the Country Roads Board, the Department of Fisheries and Wildlife, the Environmental Protection Authority, the S.E.C. pylon advisory committee, the Forestry Commission and the Soil Conservation Authority. The role of the Conservation Council of Victoria in exerting influence, and in presenting a balanced view is important to the F.N.C.V. and hence we should feed the C.C.V. with information and be strongly associated with it as well as acting independently. Indeed, the F.N.C.V. should be involved in every small conservation move. It is vital to study the Land Conservation Council study areas and particularly the Melbourne area.

Mr. Graham Douglas discussed the various approaches to fighting for conservation. Publicity is important, but the mass media is not particularly interested in the unsensational, and the type of publicity obtained by militant obstruction is not always an advantage. Formal objection by submission must be based on facts, but the problems are those of difficulty in obtaining information and of time; particularly if a decision upon an issue may be made by a government body or a local council within a few days. A decision may be gazetted even though all objections have not yet been heard, and any conservationist desirous of presenting a statutory document, must collect information on many aspects and within a most inadequate time. Such data as exists is scattered throughout government departments and universities, which may guard it jealously; as well as being scattered throughout the journals of professional and amateur bodies. A store of readily obtainable facts is vital to the conservation movement as it is facts not emotion which can be most influential in presenting a case for conservation.

The suggestions given by Mr. Douglas for ways by which the F.N.C.V. group could assist are listed below:—

- (a) Collecting and indexing information of specific areas including that hidden in the records of the groups in the F.N.C.V. This includes areas not being dealt with by any local conservation group.

- (b) Researching an area of immediate conservation interest.
- (c) Preparing a dossier of experts within the club.
- (d) Sending out a questionnaire to other groups or institutions asking if they can assist e.g. research groups in the university.
- (e) Asking members of conservation groups in particular areas for information.

One particular value of an index of such data readily available to the F.N.C.V. is that in some instances only the corporate bodies like the F.N.C.V. can lodge objections and not individuals or small societies.

After question time the chairman asked the meeting for suggestions on projects. Ones put forward included the study of a bridge in Kallista; a review of quarries — as to which are being used and what are the proposals for rehabilitation; the value of various railway sidings and cuttings and the group study of the L.C.C. study areas. It was proposed that at the next meeting, members have their copies of the L.C.C. Melbourne Study Area, and that specific tasks in dealing with the sections be allotted to members. Mr. Kelly offered to collect maps of Melbourne for the evening.

It was agreed to hold meetings on the third Thursday of the month, and application be made to the C.C.V. for the use of their meeting room in the headquarters at 15 Drummond St., Carlton.

A request was made to members by the chairman that they consider how the particular disciplines to which they belong could assist in collection and indexing of data from their records.

At the next meeting it is proposed that elections for a permanent committee be held.

The urgency of the conservation issue in the present era of rapidly expanding urban areas, increased industrialisation, increasing population and increased utilization of forests and bushland by saw-millers and agriculturists, is perhaps not realised fully even by members of the F.N.C.V., but it did come through to the audience from the speakers at this meeting. It is to be hoped, therefore, that members of the F.N.C.V. will be able to assist by taking on even a small task in any of the projects in the future. A further method by which conservation can be assisted is volunteer work for the C.C.V.

Botany Group

ANNUAL REPORT 1974

Attendances at Botany Group Meetings were consistent throughout the year and at about the same level as in 1972. Eleven Meetings were held with an average attendance of 22. Seven excursions were arranged during the year, and in addition a small group made two trips to Diamond Valley to assist a local group with a plant survey. We were also pleased to be able to help with a plant survey in two small areas on the east side of the Macedon Range.

Attendances at regular excursions varied considerably, the most popular being the Kinglake fungi trip in May and Rushworth Forest in September.

An effort was made to improve the excursion reports and plant lists, and pressed specimens of some of the interesting and unusual plants were displayed at subsequent meetings. It has been suggested that these could form the beginnings of a group herbarium, which would be a useful adjunct to our activities, but storage space at present is a problem.

A new feature started during the year was "The Plan of the Month", featuring either one species or a genus. Living or pressed specimens were displayed, a sheet of notes was available and on several occasions the Club microscopes were used to demonstrate the small parts of the flower. This series was designed particularly to help beginners to identify plants but proved popular with most group members.

We look forward to another active year and extend an invitation to anyone interested in Botany and native plants to join us at Meetings or on outings.

Day Group Report

21 March

A group of 30 members boarded the Harbor Trust launch "Commissioner" at 1.30 p.m. as guests of the Harbor Trust, and joined another group to make the journey round the Port of Melbourne.

The weather was fine but overcast as we left No. 7 North Wharf. During the two-hour journey, with a short break for afternoon tea, an excellent commentary was given by two hostesses from the Harbor Trust.

Passing down the river we first visited Victoria Dock, and heard most interest-

ing information about the vessels berthed there and of the activities going on around the area. The Port handles more than 16 million tons of cargo annually, the principle imports being motor vehicles, machinery, drugs, chemicals, paper, iron and steel. The exports include wool, meat, hides, fruit, vehicles and parts and dairy produce.

Moving down to the junction of the Yarra and Maribyrnong Rivers the "Columbus Australia" container ship was busy at work. 11,000 crates can be handled at one time, and the ship is in and out of the Port in 48 hours. We passed dredges clearing the river bed. They work 24 hourly in order to keep the river bed clear for the huge amount of shipping which comes in and out of the Port.

Eventually we passed under the Westgate Bridge, a gigantic undertaking, and finally reached Gellibrand Pier, Williamstown, passing the Floating Dry Dock and then back to our embarkation point, No. 7 North Wharf, at 3.30 p.m.

Space does not permit a full account of installations in the busy port, which will, in the future, become one of the largest in Australia. Several bird observers on board noted Gannets (busily fishing), Pacific and Silver Gulls, Black Swans, Crested Terns, Pied and Black Cormorants, and Spur-winged Plovers. Hundreds of large jelly-fish were also observed.

Everyone agreed it was a most interesting and enjoyable afternoon trip, which we hope to repeat for many members who missed out because of a limitation of passengers.

Geology Group

ANNUAL REPORT

Chairman: Mr. G. Love.

Acting Secretary: Mr. T. Sault.

Only eight monthly meetings were held during the year. Power restrictions caused the cancellation of two meetings and on another occasion the uncertainty of power caused a greatly reduced attendance. However, despite these frustrations, there was an average attendance on meeting nights of 17 members. All the speakers for the year came from within the Group. The speakers and their subjects were as follows:—

Mr. R. Davidson: "Opals and Opal Mining".

Mr. D. Myers: "Geology of Kangaroo Island".

Mr. A. Blackburn: "Continental Drift".

Mr. D. McInnes: "Conodonts".

On several occasions a panel of members spoke on a specific subject. These included "Tertiary Fossils", "Rock Formations" and "Weathering".

A book night was also held. This included Geological literature from historical to present-day publications. Mr. G. Love was the main contributor on this occasion.

The discussion on exhibits is still a feature of Group Meetings. The number of excursions was greatly reduced during the year; members being unable to attend or insufficient transport being just two of the factors. However, it is hoped this situation would improve during 1974.

Mammal Survey Group

Annual Report

Due to extraordinary circumstances the Mammal Survey Group of the Field Naturalists Club of Victoria did not publish an annual report for the year June, 1971 — June, 1972. This report covers the period from February, 1972 to June, 1973.

Early in 1972 a break-away group, the Mammal Survey Group of Victoria was formed, drawing most of its founding members from the F.N.C.V., and retaining survey records. This meant that M.S.G. — F.N.C.V. was virtually starting afresh, with group survey work commencing again in May, 1972.

Survey camps have been held at 14 localities and a summary of survey details is given in table 1. Attendance at monthly camps has averaged 15. The highlights of the field surveys were the capture of Mitchells Hopping-mouse, *Notomys mitchellii*, at Hattah, and White-footed Marsupial-mouse, *Sminthopsis leucopus*, at Main Creek on the Mornington Peninsula, both uncommon species. The group has provided information from field surveys to the Land Conservation Council, National Parks Authority and Fisheries and Wildlife Department.

Monthly meetings have been attended by an average of 18 members and five visitors. Several guest speakers have addressed the group on topics related to the study of mammals. Members normally contribute with talks, recent reports of mammals, and slides.

The group wishes to acknowledge the financial assistance received from the M. A. Ingram Trust, and thank the Fisheries and Wildlife Department for use of the meeting room in the Arthur Rylah Institute, Heidelberg.

TABLE 1

Locality	Number of Surveys	Number of Trap-nights	Number of Spot-light hours	Total Number of Specimens Identified	Number of Native Species	Number of Introduced Species
Mt. Tallarook	2	132	25	93	12	5
Mt. Disappointment	1	180	12	100	7	1
Mornington Peninsula (Main Creek)	3	290	11	166	10	2
Murrindindi River (Siberia Rd.)	1	80	17	38	7	2
Cape Liptrap	1	100	16	80	8	3
Acheron Way	1	80	19	54	8	0
Bellarine Peninsula	2	205	21	112	8	5
Stony Rises (Near Colac)	1	80	6	59	8	3
Licola	1	703	41	209	13	3
Aberfeldy	1	230	14	66	8	1
Latrobe River (Neerim East)	1	182	11	67	8	0
Hattah	1	538	22	410	3	5
Cathedral Range	1	116	17	46	9	1
Glenaladale	1	251	23	41	9	2

Chairman—Robert Lawson.

Secretary—Raymond Gibson, 7 Cook Street, Abbotsford, 3067.

Minute Secretary—Wendy Clark.

Records Officer—Lindsay Jolley.

Equipment Officer—Richard Forse.

Specialist Adviser—Stephen Morton.

Residual—Peter Homan, Tom Sault, Brian Burbage, Barry Callanan.

Camp Dates:

- 18, 19 May
- 15, 16, 17 June
- 20, 21 July
- 17, 18 August
- 14, 15 September
- 19, 20 October
- 16, 17 November
- 7, 8 December

Christmas Camp

From 24 December, 1973 to 3 January, 1974 members of the Group camped at Wigan Inlet National Park, and carried out survey work in a variety of habitats in the region. Small ground mammals seemed plentiful in most areas, species recorded being Bush Rat (*Rattus fuscipes*), Swamp Rat (*Rattus lutreolus*), Brown Antechinus (*Antechinus stuartii*) and Dusky Antechinus (*Antechinus swainsonii*). Several species of possums and gliders were seen. Brushtail Possums (*Trichosurus vulpecula*) and Yellow Bellied Gliders (*Petaurus australis*) were seen frequently in the campnig ground, and provided a great deal of interest. Ringtail Possums (*Pseudocheirus peregrinus*) were recorded from several places, and there was one record each of Sugar Glider (*Petaurus breviceps*) and Pigmy Possum (*Cercartetus nanus*). Other mammals seen were Wombat (*Vombatus ursinus*), Black Wallaby (*Wallabia bicolor*) and Fox (*Vulpes vulpes*). As well as mammals, frequent sightings of reptiles and the prolific bird life helped make this an enjoyable Christmas camp.

Marine Biology and Entomology Group 3 March

Twenty-one members attended the meeting. The Speaker for the evening was Dr. Brian Smith, Curator of Invertebrates at the National Museum, who spoke on "Deep-Water Dredging in Bass

Strait". He prefixed his talk by giving a few details of his trip, which was made possible due to a grant to the National Museum by the Technical Commission for Oceanography, as a result of prolonged request for such work in Victorian waters.

The objectives were to obtain systematic deep-water dredgings from the Continental shelf and slope of Eastern Bass Strait.

The survey ship "H.M.A.S. Kimbla", actually a converted boom defence vessel, was at sea for eight days, during which time dredging was carried out at 71 stations, ranging in depth from 19 fathoms to 600 fathoms, as well as magnetometer work carried out for the University of New South Wales. There were four scientists on board, Dr. Smith as Cruise Leader, a second staff member of the Museum and two Associate workers, and members of the Marine Study Group. Dredging transects were carried out at Cape Horne, Point Hicks, Flinders Island and Wilson's Promontary, with particular attention being given to a dredging station first sampled in 1870's by "The Challenger" off East Moncur Island. Dr Smith commented on the invaluable assistance given by members of the crew, with the heavy equipment; and the intense interest shown by them.

Fourteen drums of material were dredged, much of which was fairly rare. Numerous excellent slides taken by Dr. Smith gave members an idea of the vast undertaking, and it will be many months before the material is sorted. At the conclusion of the talk, Mr. Kelly thanked Dr. Smith for a most interesting and informative talk. This interest was shown by the many questions put to Dr. Smith.

Exhibits:

1. Wanderer butterfly larvae found by Mrs. Lee on a swan plant at Reservoir.
2. Pupa of Butterfly (*Papilio anactus*) Dingy Swallowtail found at Box Hill North by Mr. Condron.
3. Cocoons from Apanteles Wasps found at Toorak by Mr. K. Strong. These wasps are only about 4 to 5 mm in size and described as Microgasters. They lay one or two eggs in the egg of a moth. When the caterpillar emerges it carries within it the egg or eggs which may develop into one or hundreds of wasps.

Current List of Office-Bearers for Country and Junior Clubs

May, 1974

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Secretary: Miss Z. Banfield, 7 Ligar Street, Ararat, 3377.

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*Ballarat Field Naturalists Club

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President: Mr. H. Hooper, Gracefield Road, Ballarat, 3350. Phone: 34 7440.

*Benalla Field Naturalists Club

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*Denotes affiliation with the F.N.C.V.

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Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 10 June — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Speaker—Dr. Brian Smith: "Environmental Survey of Dartmouth Dam".

New Members:

Ordinary:

Miss Elsie J. Hutchinson, 5 Kerferd Road, Albert Park 3206. Entomology.
Mr. Mark N. Hutchinson, 91 Whittens Lane, Doncaster 3108. Reptiles and Ecology.
Mrs. Ella Marsh, 1 Denvet Crescent, Mulgrave 3170. General.
Mr. George Heys, 12 Belmont Ave., Upwey 3158. Field and Mammal Survey. Botany and Geology.

Junior:

Richard Howes, 32 Jennings Street, Curtin, Canberra City. General.

Monday, 8 July — Miss Madge Lester, "The Alternation of Generations in Green Land Plants".

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated.)

Thursday, 13 June — Botany Group — "Wildflowers of the Sydney Sandstones": Mr. A. Stirling.

Wednesday, 19 June — Microscopical Group.

Thursday, 20 June — Conservation Group meeting at 15 Drummond Street, Carlton, at 8 p.m.

Thursday, 20 June — Day Group Meeting in Conference Room, National Museum, Little Lonsdale Street entrance. Meet 11.30 a.m. Bring lunch. Dr. Brian Smith, Curator of Invertebrates, will give a talk on his Section.

Thursday, 27 June — F.S.G. Meeting in Conference Room, National Museum, at 8 p.m. Specialist topic: "Data Collection and Storage".

Monday, 1 July — Marine Biology and Entomology Group Meeting in Conference Room, National Museum, at 8 p.m.

Wednesday, 3 July — Geology Group.

Thursday, 4 July — M.S.G. Meeting at Arthur Rylah Institute, 123 Brown Street, Heidelberg, at 8.00 p.m.

F.N.V.C. Excursions

Sunday, 16 June — Mornington Peninsula. Leader: Mr. T. Sault. The coach will leave Batman Avenue at 9.30 a.m.; fare, \$2.50. Bring one meal.

Sunday, 1 September, to Sunday, 8 September — Kangaroo Island. The balance of the payment for this excursion (\$135 less deposit already paid) should be forwarded to the excursion secretary by 8 July, and members requiring berths on the train leaving Melbourne, Saturday evening, 31 August, should send the train fare in addition. Sleepers per person \$32.07, or first class seats \$21.67. Members wishing to extend their stay in Adelaide should indicate this. It is necessary to travel in a group on the forward journey to obtain this concession but not necessary to return together. Those not travelling by train should meet at Adelaide Railway Station at 8.45 a.m., where the bus will wait for the members arriving on the Overland and take the party to Mt. Lofty and Cleland Wildlife Reserve, then on to the Adelaide Airport by 3.15 p.m. to board the plane to Kangaroo Island. See earlier **Naturalists** for other details. All cheques should be made out to Excursion Trust.

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Due to the Assistant Editor, Graham Douglas being ill, there is unfortunately no news column this month.

However, Graham is certain he will be able to continue the column in July.

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The Lyrebird never ceases to enchant
the nature lover — and now is the
time of the year when they are to
be seen to best advantage.



Flinders Island Nature Notes

(22 February – 2 March 1974)

by ELIZABETH K. TURNER

It seemed appropriate to visit Flinders Island in March 1974, as this month marks the bi-centenary of the birth of the extraordinary navigator and explorer Captain Matthew Flinders R.N.

It was Captain Tobias Furneaux in the "Adventure" who first saw the islands in 1773 when his ship became separated from Captain James Cook in the "Resolution" during Cook's second voyage to the Pacific. Furneaux named Cape Barren Island to the south of Flinders Island, and also the Sisters Islands to the north, but he did not explore the area nor anchor or land, and he was unable to determine whether or not Flinders Island and Cape Barren were joined.

Matthew Flinders in the colonial schooner "Francis" was ordered to Preservation Island south of Cape Barren in 1798 to rescue the survivors of the "Sydney Cove" wrecked there in 1796, and Flinders began his charting and exploration of the area now known as Bass Strait.

Nowadays one flies to Flinders Island in a small plane, passing over Wilson's Promontory and then out to sea over a large number of rocks and islands forming part of the 126 visible pieces of land in Bass Strait of which only seven pieces are inhabited permanently. Fifty of these islands lie in Eastern Bass Strait; their rocks are the remnants of the old land bridge which connected southern Victoria to Tasmania until around the close of the Pleistocene era, when there occurred a general submergence of the south

coast of Victoria due in part to the melting of the ice-caps and glaciers of the Northern Hemisphere, and the rising of the sea level. Over this bridge some of the now extinct Tasmanian Aborigines must have migrated south.

The rounded, streaked granite rocks of Flinders Island resemble the hills of Wilson's Promontory, and the clear white sands and turquoise green of the sea in the bays and inlets is reminiscent of Wineglass Bay on the Freycinet Peninsula on the east coast of Tasmania.

Our first impression, after landing at the drome three miles north of Whitemark, and travelling nineteen miles south to Lady Barron, was that we were again on the Isle of Skye off the Scottish coast; the farmlands were brown and bare except for clumps of tea-trees and melaleuca and occasional hills clothed with *Casuarina littoralis* (Black Sheoke) and for some days we persisted in calling the Strzelecki Range (2,481 feet) the Cullins!, but the resemblance was superficial — there were no crofters' cottages and the sheep looked to be the usual Australian type, merino or merino-cross. In several of the grassy fields we saw to our delight, flocks of Cape Barren Geese (*Cereopsis novaehollandiae*) varying from about 8 to 40 in number, and easily visible from the road. These birds remained apprehensive while the car was stopped, but continued grazing after a few minutes.

The terrain became sandy, as we took the coast road, with large areas

of bracken-fern and some fields of heath, rushes (*Lepidospermum* sp.), *Gahnia psittacorum* and *Xanthorrhoea australis* (grass tree), most with burnt and blackened butts and about four feet high. *Banksia marginata* in flower bordered the road, interspersed with bushes of *Acacia diffusa* and tea-tree (*Kunzea ambigua*) a few rare sprigs of which were still in flower. On the heath lands, there appeared to be several species of epacrids, *Pultenaea* not in flower, *Leucopogon virgatus* in flower and many *Helichrysum* species and *Olearia* with the bracts of many flowers still intact. *Stylidium graminifolium* seemed to grow well in the sandy soil and some were still in flower near the coast. Stunted eucalypts seemed to be mainly *E. globulus*, the southern Blue gum.

We were dismayed by the number of Red-necked Wallabies (*Wallabia rufo-grisea*), Pademelons (*Thylogale billardieri*) and Brush-tailed Possums similar to those in the Tasmanian north-east, lying dead on the roadside; this, in spite of the sparse number of automobiles on the island. In the days to come, we were to note fresh marsupial casualties daily, whilst we saw three live marsupials only, in 500 miles of driving about the island.

The road reached the south coast at Adelaide Bay and we enjoyed the views of the islands in Franklin Sound with the backdrop of Mt. Munro (2,348 feet) and the mountains of Cape Barren Island to the south (Plate 1). The tide was low exposing rich-looking mud-flats on which were Black Swans, Silver Gulls, Black-faced and Pied cormorants, Sooty and Pied Oyster Catchers and an Eastern Swamp Hen. A noisy band of Yellow-tailed Black Cockatoos heralded our entry into Lady Barron, the second largest town on the island with a population of 150. Near the local tiny store, a pair of Green Rosellas with yellow bellies announced their presence by chattering in a clump of *melaleucas*.

Our house was on a sand hill at the foot of Vinegar Hill, from where a superb view over the Franklin Sound could be obtained; this lookout is used by the local fisherman to estimate the ferocity of the sea at the Eastern outlet of the Sound, known as the Pot Boil, near which lie the Vansittart Shoals. Vansittart (or Gun Carriage) Island has a prominent hillock at its eastern end, and on this island there are still remains of convict graves. On the eastern shore, one can see the

Plate 1

From Flinders Island looking across Franklin Sound to Mt. Munro, 2,348 ft., Cape Barren Island.



wreck of the "Farsund", which occurred in 1912, looking as though it were ready to sail at any time.

In the bush surrounding the house, we discovered a bush of *Boronia anemenifolia* with a few pink flowers, and noted a family of Superb Blue Wrens and many Honeyeaters.

Early next morning we heard a Kookaburra, and a Magpie carolling; apparently these latter are the white backed variety introduced from Victoria.

Our first excursion was to Trouser's Point beach (Plate 2). The sea water there has been said to be sapphire in colour and there are large granite outcrops surrounding the bay, splashed above sea level with a thick line of vermillion lichen. Casuarinas grow over the sand dunes to the level of the intensely white sand. This bay seemed to be a nursery for handsome black and white Pacific Gulls (*Larus pacificus*) and their great brown offspring; and Hooded Dotterel were also seen on the beach. Further out from the beach, a flock of Fairy Terns was seen fishing.

Australian Pipits frequently streaked off ahead of the car, especially in the agricultural areas on the

east of the island, where intensive Soldier Settlement has occurred; and we frequently disturbed seven or eight Spur-winged Plover near the roadside.

Back at Lady Barron deep sea wharf, the "Joseph Banks", an island supply ship, had unloaded into nearby yards a mob of cattle which bellowed most of the night. Some of the crayfish boats had also returned and that evening we were able to buy an enormous flathead for our evening meal. Here also, we were able to meet and talk with Cape Barren Islanders, whose forebears were nine British seamen, six Tasmanian and three Australian female Aborigines and one Maori woman. This hybrid race of persons, of whom there are less than one hundred now, have a distinctive dialect. They omit explosives such as "t", "d" and "p" from their speech; for instance Cape Barren is always "Kay Barren"; Wednesday is Wen'y. During our short sojourn, we encountered only male Cape Barren Islanders, whose skin colour varied from coal-black (typified by tall, friendly Eric Maynard), to varying degrees of swarthinness, associated



Plate 2

Trouser's Point.
Mountains of
Cape Barren
Island in
Background.

with varying degrees of Aboriginal facial characteristics.

Next day, we were surprised at the rain-forest type of vegetation, and tall eucalypts (*E. viminalis*) in the gullies and on hillsides of the Darling Range which runs north and south, almost in the centre of the island. This has one outstanding "sharp edged" granite peak near the centre. We ascended Walkers Hill (1,400 feet) and noted the handsome, black-fruited tea-trees and narrow-leaved *Bedfordia linearis* and the Soft (*Dicksonia antarctica*) and Rough (*Cyathea australis*) Tree Ferns in the gullies. Later, on Strzelecki Peak, we saw these Tree Ferns again, and the Austral King Fern (*Todea barbara*) in the stream bed.

That day, we also visited the lonely chapel at Wybalenna, now undergoing restoration at the hands of the local branch of the National Trust (Plate 3). This chapel is the only building still standing which was actually used by the last of the Tasmanian Aborigines, when Wybalenna was made an Aboriginal reserve near Settlement Point. George Augustus Robinson, an amazing Englishman, tried unsuccessfully to succour what was left of the

Tasmanian blacks by gathering them together at this point on Flinders Island. The graveyard nearby contains a plaque commemorating the passing of over 100 Aborigines, and a gravestone dated 1835 bears an inscription recording the death of the last chief of the Portland Tasmanian Tribe — Mannalargenna. The tombs are empty, the bodies having been conveyed to secret burial places to prevent "body snatching" (Plate 4).

Flinders Island, during our stay, had not had any rain for about one month, the ground was very dry, and domestic water supplies restricted. Most mornings were cloudy and occasionally a soft, woolly sea-mist settled in layers over Franklin Sound. The afternoons were sunny and warm, but not as hot as the weather experienced in Victoria at the same time, according to reports on our radio.

Next day we visited the home of Mr. D. Smith in Whitemark; who has a small private museum and zoo. Here we photographed a small, appealing wombat called "Doris" (*Phascolomys platyrhinus*), Flinders Island being apparently the only island in Bass Strait where wombats have not been exter-

Plate 3

Wybalenna Chapel.



minated by man; but even here they are unpopular with the farming community. This young animal, not much longer than twelve inches had already made an excavation in the ground of the enclosure which she shared with a young Brush-tailed Possum. In one small enclosure eight Potaroos had concealed themselves so well under grass tussocks, that we were unable to see these bandicoot-like creatures until they were flushed out.

A family of Cape Barren Geese strutted about the yard, headed by a rather resentful and aggressive female named "Gordon"; her mate known as "Gotch", seemed less concerned. A Bennett's Wallaby and a Pademelon also occupied the back-yard enclosure. There was also a rather dilapidated specimen of a Blue-winged Parrot (*Neophema chrysostoma*) with a large Wedged-tailed Eagle, who was fed on fresh marsupial carcasses from the roads.

In our own house, we caught a large black rat, which had been pilfering the food stores; this appeared to be the ordinary ship rat (*Rattus rattus*). One spiny ant-eater (*Tachyglossus setosus*) was seen dead on the road.

Next day, we determined to ascend the Strzelecki Range, along a well-marked track beginning opposite Mr. Rhodes farm at Locotta (Plate 5). However, it was a hot day and only one member of the party finally reached the top of this range, to be threatened by a cloud.

The views out over the agricultural flat lands bordering the west coast were rewarding, and one could see the mountains of the north-west coast almost fifty miles distant.

Although we had been warned about the prevalence of tiger, copper-head, and brown snakes, we did not encounter any living specimens, although two dead tiger snakes were seen on the road. From the range we had a splendid view of Chappel Island with its conical hill (Plate 6), named by Flinders for his friend Annette Chappel, whom he afterwards married and who waited so many years for his return to England, whilst he languished imprisoned in Mauritius with failing health, which unquestionably brought about his early death at the age of 40 years.

Chappel Island is indicated on the maps as —"the place where Eric Wor-



Plate 4

Empty tombs of Tasmanian Blacks at Wybaelenna with monument to Manna-largenna.

rell catches his big snakes". Apparently, the tiger snakes have evolved to enormous size and number on this island. Lizards and small skinks were commonly encountered.

The track up the range passed through Manuka Tea-tree (*Leptospermum scoparium*) and *Malaleuca squamea* thickets. It then wound through Casuarina stands, over bare granite rocks, and into fern gullies with numerous *Zieria smithii* trees. Near an almost dry waterfall, some large Grey Currawongs gave a rather raucous concert; and a flame-breasted robin was seen, along with some thornbills.

Eucalyptus globulus, *E. nitida* and *E. viminalis* grew on the slopes, but there were very few flowers at this season. We saw some *Goodenia ovata*, plus a small lilac *Scaevola* sp., and a blue *Lobelia* ? *alata*. We passed through a stand of *Hakea epiglottis*, and the climber who reached the top was rewarded with a fine specimen of *Lycopodium varium*.

On our return to Lady Barron, we visited Miss Barrett, whose father Bill Barrett settled on Long Island close to Cape Barren Island. Miss Barrett,

who is a source of much local information, lives in a green painted, corrugated iron cottage, set back deeply in a tall tea-tree thicket, the lower storey of which is impenetrably festooned with introduced *Asparagus* fern covered with small red berries. She mentioned that the temperature inside her cottage on hot days reaches 110° F.

Our next excursion was to Cameron's Inlet on the east coast; the track was rather sandy in patches, but passable to a car because of the criss-crossing roots of the tea-tree and the mats of *Carpobrotus rossii*, *Origium* sp. and near the coast *Salicornia australis*. The inlet, which is long and shallow, is barred from the ocean by wide, white sands and is the home of many birds, including Swans, Pelicans and many gulls. West of Babel Island, which is visible from the ocean beach at this spot, is Cat Island on which there is a Gannet rookery, depleted by crayfishers as bait for their pots. This was once one of the largest Gannett rookeries around the Australian coast.

Ocean bathing off this inlet proved rather difficult because of strong, under-tow currents. One of us dis-

Plate 5

Strzelecki
Peaks 2,481 ft.
Ascent route
visible right
of centre.



covered a green glass trawling ball covered with rope netting, fully twelve inches in diameter. The carcasses of several Fairy Penguins and a Tasmanian Mutton-bird were also found entangled in the sea-wrack. Fibres of the marine fibre-plant, *Posidonia australis*, a marine angiosperm, were also found rolled up in various sizes on most of the beaches, but were prevalent here. The grass wracks *Zostera* sp. were also seen, and the vegetation along the sand dunes was so dense that it was quite difficult to find shade for our picnic lunch.

Here, and later also at North-East river, we saw and heard the Eastern Curlew on the tidal flats. Hooded and Red-capped Dotterels ran along the ocean beach ahead of us as we walked. We did not see their nests, and we hoped we had not walked on them inadvertently as they are so small and so well camouflaged. A Black-faced Cormorant sat on a dead tree branch in the inlet and White-faced herons seemed abundant on the reefs.

Correa alba was in flower near the coast; also the green bells of *Correa reflexa* were abundant. *Acacia verniciflua* was in flower further inland. The red heads of *Acaena anserinifolia*

and *A. ovina* covered our socks after a bush scramble during which the spines of *Busaria* sp. and *Acacia verticillata* proved a deterrent to extensive exploration.

The ocean beach proved a treasure trove for shells; a large rock-whelk shell being picked up, and also many large crenulated limpets, abalone and scallop shells in various rose tints, as well as small cowries and turbos.

Inland in all areas of the island, especially near the farmlands, there was an abundance of birds of the hawk family, including:— pairs of Swamp Harriers, a Goshawk, several Nankeen Kestrels and some Little Falcons in the north. Brown Hawks were common, and one insisted on sitting on the motor road in the north, rising lazily when a car approached to return persistently to the same area when the car had passed; a rather hazardous hunting ground we considered!

Ravens were seen and heard in the agricultural areas, but were not prevalent. An Australian Grey Thrush sang frequently near our house, and on one occasion, we heard a Grey Butcher-bird calling. We frequently encountered Swifts on the wing along



Plate 6

Fotheringate
Bay from
Strzelecki Peak.
Chappel Island
in background.

the east coast, and at Barrow Point, the south-west corner of Adelaide Bay, we encountered a male Musk-duck.

Along the inland roads were fine stands of *Lasiopetalum dasyphyllum* interspersed with Manuka and *Melaleucas*, also some bushes of *Coprosma hirtella* and *Boobialla* (*Myoporum insulare*). The blue flowers of *Dampiera stricta* and *Scaevola pallida* were also found along the road verge. Here we also found *Bauera rubioides*. Introduced birds such as the Blackbird, Skylark, House Sparrow, Goldfinch and Starling were not difficult to see, especially around the settlements. The purple flowers of a small *Mazus pumilio* were found on the cliff above the sea at Trouser's Point. Beside the road at the northern end of the island, we found a Native Cypress Pine (*Callitris rhomboidea*).

Our next day's excursion was almost fifty miles to the north, where we visited Killicrankie Bay and Palana beach where a hedgerow of pink Belladonna lilies lined the road into the small settlement; from here the East and West Sister Islands seemed quite close. We then took the northern track marked "Danger, Road Impassable", over dry swamp lands to the North East River, where a number of fishing huts had been erected in the tea-tree between the road and the sandy river beach. Again many and varied sea-birds and swans were in evidence.

On our return, we visited the topaz mine near Tanner's Bay, having been lent spades and sieves by Mr. Worth. At first, we had little success in finding these so-called "Killicrankie Diamonds", but after watching three men, who had dug an excavation down below water level in the creek bed, and who offered us several sieve fulls of their diggings, we were able to col-

lect a handful of small, clear topaz crystals; this is a mineral of granites and other igneous rock and is an alumino-fluoro-silicate. These gentlemen, who had been working at their diggings all day, had some quite large crystals, some of them gem quality, which they intended selling.

A swim at Tanner's beach, which faces south, completed the day. Here there is a small headland of limestone on the northern shore; there are also some limestone cliffs and reefs at Settlement Point below Emita.

On our last day on the island, we visited a widow who lives alone at Lady Barron and grows an amazing variety of exotic fruits and flowers on a thirteen acre property facing Franklin Sound. She has three or four huts in which she sleeps or eats, and two wheel-less buses in which students or others may stay rent free if they assist with some of the work in her garden. We then visited our favourite Trouser's Point bay and later White Sands, also known as Possum Boat Harbour east of Lady Barron. Preparations were then made for our early morning departure by plane from Whitemark next day.

We were pleased to observe the notice at the airport which prohibits the entry of rabbits to Flinders Island. The islanders were waiting expectantly for the opening of the mutton-bird season, which begins on 27 March and ends on 30 April. This activity takes place at night on the islands in Franklin Sound and surrounding islands. To the Cape Barron Islanders, this is the season in which most of the work is done, and most of the yearly income is made. The harvesting of the young mutton-birds (Short-tailed Shearwaters), formerly held pride of place as the mainstay of the Flinders Island economy, but has now been superseded by farming and fishing. On

Fischer Island, near the Lady Barron wharf, the C.S.I.R.O. and the Tasmanian Animals and Birds Protection Board have set up a station for investigation and banding of the mutton-birds. At present, that station is manned by a Victorian woman who makes Radio Telephone contact with Miss Barrett at Lady Barron each evening.

While this article does not pretend to offer a complete list of fauna or flora of the island, nor offer a brochure for tourists, it is submitted as an account of the things that amateur naturalists may see and enjoy "without tears" during a one-week holiday at this, as yet, peaceful paradise — Flinders Island.

The Origin of Generic Names of the Victorian Flora

Part 2 — Latin, Greek and Miscellaneous

[continued from 91 (5)]

by JAMES A. BAINES.

***Borago.** Late Lat. for *B. officinalis*, Borage, possibly from Lat. burra, a hairy garment, or borra, rough hair; in allusion to the hairy leaves. Skeat derives it from French bourrache, which came through Spanish borraja from Arabic abu rashh, literally "father of sweat", the borage plant being a sudorific. The common name is pronounced as if spelt like the surname Burridge, but the first syllable of the family name Boraginaceae is sounded like bore.

Bothriochloa. Gk bothrion, a little pit (from bothros, hole); khloe or chloe, grass, or the young shoots of herbage. *B. ambigua* is Red-leg Grass or Pitted Beard-grass.

Botrychium. Gk botrys, a bunch of grapes; referring to the bunchlike formation of the spore-bearing organs of these deciduous ferns, an alternative name of the European Moonwort being Grape Fern. Our native species are *B. lunaria*, Moonwort (lunaria of course meaning moon-like) and *B. australe*, Austral or Meadow Moonwort, the former being identical with the species found in English meadows, and in North America, where it is also known as Moon Fern.

Brachychiton. Gk brakhys, short; khiton, an undergarment or tunic; alluding to the loose outer covering of the seed or the overlapping scales. Our species is *B. populneus*, the Kurrajong.

Brachycome. Gk brachys, short; kome, hair; alluding to the short bristles of the pappus. Eichler has restored the form *Brachyscome* used in the original naming of the genus by Cassini (1817), which Cassini himself corrected in 1825. Victoria has 32 species of these attractive daisies.

Brachyloma. Gk brachys, short; loma, fringe, edge; alluding to the hairs or scales in the throat of the corolla tube. Our four species include Daphne Heath and Brush Heath.

***Brachypodium.** Gk brachys, short; podion, a little foot; the pedicels of the spikelets being very short. Our introduced species is *B. distachyum*, False Brome.

Brasenia. The genus *Brasenia* includes a tropical American species (family Cabombaceae takes its name from *Cabomba*, an indigenous word from Guyana), so Schreber could have named *Brasenia* from Brasil, the

older form of Brazil, but the origin of the name is quite obscure. Our species, *B. schreberi*, is an aquatic plant known as Water-shield. (Brassen is one German word for carp.)

***Brassica.** The classical Lat. name for cabbage. Six introduced species have become naturalized in Victoria: **B. oleraceus*, Cabbage (the specific name means "pertaining to kitchen gardens", for pot-herbs), **B. rapa* subsp. *sylvestris*, Wild Turnip, **B. napus*, Rape (rapum was the classical Lat. name for turnip), *B. nigra*, Black Mustard, as well as the Mediterranean Turnip and Twiggy Turnip.

***Briza.** Gk name of a rye-like grain growing in Macedonia (from Gk brizo, to nod, be sleepy). Linnaeus probably adopted the name because the flower-heads of *B. maxima* (Shell Grass or Large Quaking-grass) and *B. minor* (Shivery Grass or Lesser Quaking-grass) nod in the breeze. It is just a coincidence that the English word breeze came from old Spanish briza.

Bromus. Gk bromos, the ancient name for the oat. Victoria has nine introduced species, mostly known as brome grasses, and one native species, *B. arenarius*, the only indigenous species of the genus in Australia (it has become naturalized in western U.S.A., including California); its common name is Sand Brome.

***Buglossoides.** Gk, meaning "like *Buglossa*" (another boraginaceous genus), the name of which means ox-tongue. *Lithospermum arvense*, Corn Gromwell, is placed in this genus by Eichler in his "Supplement to Black's Flora of South Australia".

Bulbine. Lat. name for some kind of bulbous plant (bulbus, a bulb). Our two native species, Bulbine Lily and Leek Lily, have been placed in a

separate genus, *Bulbinopsis* (meaning "with the form of *Bulbine*") by Borzi, the rest of the species, 55 in number, being from tropical and southern Africa. (This has been accepted by Hj. Eichler (in the work cited in previous entry).

***Bupleurum.** Gk boupleuros, meaning ox-rib, a name for another plant. **B. rotundifolium* (Hare's-ear or Modesty), was included in Ewart's "Flora of Victoria" on the strength of a Loddon River collection, but J. H. Willis has removed it from the flora because of the absence of further records.

Bursaria. Lat. bursa, a pouch or purse; alluding to the fruit. (Cf. *Capsella bursa-pastoris*, Shepherd's Purse, named for similar reasons.)

Caesia. Feminine form of the classical Lat. adjective caesius, bluish-grey, used by the Romans in describing the colour of eyes. The word is familiar also to those who grow the Western Australian *Eucalyptus caesia* (Gungurru). Those who use the traditional English pronunciation of Latin should pronounce the first syllable as in Caesar; those who prefer the presumed classical pronunciation (as used by Julius Caesar) should pronounce it as in Kaiser (the German word for Emperor that is a modern form of Caesar, as is Tsar in Russian). The pronunciation commonly heard, with the first syllable k, must be wrong.

Cakile. Arabic qaqulleh, which is the Arabic name of Sea Rocket, *C. maritima*, a cosmopolitan plant found on most sea coasts around the world. As the Arabic vowel in the first syllable is long, it probably should be pronounced with the first syllable either kahk or cake, but Black accents the second syllable.

Caladenia. Gk kalos, beautiful; aden, gland. Victoria has 22 species of these beautiful terrestrial orchids, most of them known as Spider Orchids, but some lovingly named Pink Fingers, Pink Fairies, Blue Fairies, Hare Orchid, etc.

Calamagrostis. Gk kalamos, a reed; agrostis, a kind of grass. *C. quadriseta* is now *Deyeuxia quadriseta* (Reed Bent-grass). Our grasses at one time included in this genus are classified variously in *Deyeuxia*, 5 species, and *Agrostis*, 1.

Calectasia. Gk kalos, beautiful; ektasis, development; alluding to the blue spreading perianth-lobes. *C. cyanea*, Blue Tinsel Lily, is a monotypic species that fully justifies the meaning of its name, and *cyanea* means blue.

***Calendula.** Lat calendae, the first day of the month; alluding to the long flowering period of some of the species. Our two introduced species are the Garden or Pot Marigold and the Field Marigold.

Callistemon. Gk kallos, beauty; stemon, a stamen. It is the attractive stamens of the bottlebrush flowers that prompted this name, the pronunciation usually heard in Australia on the second syllable being in defiance of all reference book accent recommendations, but nevertheless in accordance with the usual shifting of accent in compound Greek nouns. Victoria has seven species.

Callitriche. Gk kalos, beautiful (kallos, beauty); thrix, trikhos, hair. Known as Water Starworts, Victoria has six native species and two introduced. The accent recommended is on the second syllable (justifying the comment under the previous item above).

Callitris. Gk kallos, beauty; the second element, -tris, "has no mean-

ing" (says Jaeger), but Black derives it from Gk treis, three (there being "leaves usually in whorls of 3"). It is possible that Ventenat, who named the genus, saw a resemblance in the foliage of these Cypress Pines to "beautiful hair", with the origin identical with *Callitriche*, the second element being softened both for euphony and differentiation. Black accents the first syllable, but others the second — take your pick, as both are commonly heard.

Calocephalus. Gk kalos, beautiful; kephale, a head; alluding to the massed flower-heads of such species as *C. brownii*, Cushion Bush. Our four other species are known as Beauty-heads, a literal translation of the generic name.

Calochilus. Gk kalos, beautiful; cheilos, lip, margin or brim; alluding to the colourful labellum of these Beard Orchids, of which Victoria has six species.

Calomeria. Gk meris or meros, a part; kalos, beautiful. *C. amaranthoides* had very little priority over its better-known synonym, *Humea elegans*, Incense Plant or Plume Humea. (The plume of flowers resembles an amaranth.)

Calorophus. Gk kalos, beautiful; strophos, twisted; Labillardière's *Calorophus* was "corrected" to *Calostroplus* by F. Mueller because the Rope Rush, *C. lateriflorus*, lent itself to the "twisted" derivation. Robert Brown named the species *Restio lateriflorus* four years after Labill founded the genus *Calorophus*.

Calostemma. Gk kalos, beautiful; stemma, a crown or garland; alluding to the inner crown (corona) of the perianth. Our species, *C. purpureum*, is known as Garland Lily.

to be continued

Importance of the Mount Napier Volcanic Complex near Hamilton, Victoria, Australia

by EDMUND D. GILL and

L. K. M. ELMORE.

Mount Napier is one of the outstanding volcanoes of Victoria. If we had a National Geologic Trust, it would be classified A ("to be preserved at all costs"). The reasons for this are many, but the following will give some idea of what is involved.

Complex of Volcanic Wonders

Mount Napier is not simply an interesting eruption centre—it is a whole complex of volcanic phenomena of world importance (Plates 1-2). Tourists are paying millions of dollars each year to see exactly the same kinds of features in other parts of the world. It is time we realized the volcanic marvels that exist in Victoria, including the Mount Napier complex. In 1945 fifty overseas, interstate and Victorian geologists and geomorphologists made a four-day tour of the vast basalt field of Western Victoria. It is one of the largest volcanic landplains in the world (some say the third largest), covering over 10,000 km.² On the final day an "Au revoir" dinner was held at Ballarat, and the late Professor Griffith Taylor made a speech. He stressed one point in particular. As far as his words can be recalled, they were, "I have visited all the main volcanic areas of this globe. . . . What impresses me so much is that there is such a diversity of volcanic features in this one lava field in Victoria. There are at least two bigger lava plains, and there are places where there are very much higher piles of volcanic ejectamenta such as in Hawaii, but I know of no basaltic field in the world that has so great a range of volcanic phenomena

in so limited an area." That was a significant statement.

Your Notebook Entry

So the people in Victoria in general should take note, and the people of the Hamilton region in particular should recognise, that we possess a volcanic field that will certainly become a great scientific and tourist attraction. The trouble is that the place is as yet barely known, and little understood. We owe a great deal to the Field Naturalists' Clubs for watching over this irreplaceable asset until its great value for science is made known by publication, and something done to develop its potential.

Local action saved some exceptionally fine parasitic cones that would otherwise have been bulldozed for road metal. There is no necessary conflict between the needs of industry and the preservation of important national monuments. Both can contribute to the Quality of Life. We will take up this point a little later.

Mount Napier Known Overseas

Some of our volcanic features are more famous overseas than they are here. In San Francisco, E. D. G. stood in a line of people waiting to register for a meeting of the Geological Society of America, and found himself next to a famous Professor interested in volcanoes. He knew about Mount Napier, its parasitic cones, the lava barriers to the west, and the Byaduk lava caves (Skeats and James 1937). He had read of the Red Rock complex north of Colac, and the Dreeite tumuli. He knew of the maars (such as Lake Keilambete)



Plate 1

1. Aerial view of Mount Napier.
2. Mount Napier from scoria cone at Menzel's Quarry.
3. Aerial view of Byaduk Caves.



Plate 2

1. Harman's No. 2 Cave, Byaduk.
2. *Eucalyptus* tree roots in cave at Site 21, Fig. 2.
3. Lava stalactites at Site 4, Fig. 2.

June, 1974

of Western Victoria (Grayson and Mahony 1910), and the Tower Hill Caldera (Gill 1967). These remarkable features (Figs. 1-2) deserve greater attention, and in the future will certainly receive it.

Present Literature

Hundreds of literature references exist to Mount Napier and its galaxy of volcanic features. Probably James Bonwick (1866), the celebrated school master of early Victoria, was the first writer to describe the Western District volcanic field. He wrote, "The lava flow from Napier flowed fifty miles southward." Perhaps he thought that the basalt of the plain extending south towards Warrnambool came from Mount Napier. Skeats and James (1937) provided the first scientific account of the geology and geomorphology of Mount Napier, the Harman Valley, the Byaduk caves and Condah Swamp. Hills (1938) considerably advanced our knowledge of the lava plain, and commented particularly on the Mount Napier-Byaduk - Harman Valley - Condah Swamp sequence of features.

The Royal Society of Victoria conducted a Symposium on the basalt plains of Western Victoria, wherein Gill (1964) dealt with stratigraphy, Ollier and Joyce (1964) the geomorphology, and Gibbons and Gill (1964) the soils in relation to chronology. Gibbons and Downes (1964) made a careful study of the land systems in this area. Mount Napier and its lava flows form part of the Eccles land-system. The ancient basalt plain of the surrounding country belongs to the Hamilton system, while the extensive ponded stream area north of the Mount Eccles volcanic assemblage is called the Condah Swamp land-system.

While the foregoing constitutes the main literature on the geology, soils

and geomorphology of the Mount Napier volcanic complex, there are hundreds of other references. Even so, we know next to nothing of this fascinating wonderland of recent volcanic activity. No systematic scientific study has been made of it, and no detailed study of any unit. A great deal that has not been published is known by the Field Naturalists and others, but still the place is relatively unknown from a scientific point of view. Obviously it has vast potential, and to protect it should be the endeavour of every citizen interested in understanding our world.

Conservation

This brings us naturally to the subject of conservation. A great deal of unnecessary strife occurs on this matter. The hot-gospeller of conservation (as he is often called in U.S.A.) says everything *must* be conserved. The practical engineer says we *must* have materials for making roads and bridges, homes and hospitals. The problem is that many fight their point of view before getting the scientific data. No rational rapprochement of any problem can be achieved if basic data are not collected first.

For many years people worked to prevent the destruction for road metal of the Tower Hill volcano near Warrnambool (Gill 1967), which is of about the same age as Mount Napier. The authorities concerned said they *had* to have the road making material. This was accepted, but it was pointed out that the same material could be obtained nearby without destroying an irreplaceable caldera.

The same principle applies to Mount Napier. It would be a civilizational sin to destroy those parasitic cones, for example. The same material can be obtained nearby without destroying the scientific and scenic wonders which one day will be a signifi-

cant part of the educational attraction, the recreation, and the tourist wealth of the region.

The Better Way

We believe that for a national park to be viable, it needs to be strongly based scientifically, scenically, and financially. To be viable, it needs to be big enough to operate as an eco-system. To preserve the lakes at Mount Eccles, and have the same small mountain being dug away from below is ineffective. A larger park

there is necessary if it is to survive. The removal of scoria needs to be controlled.

Modern means of transit make it easy for people to travel considerable distances in a short time at low cost (relative to modern standards of living). Instead of each city and town trying to have a museum of natural history, a technological museum, and an historical museum (for example), there could be at some place a major centre which is so large and strong as

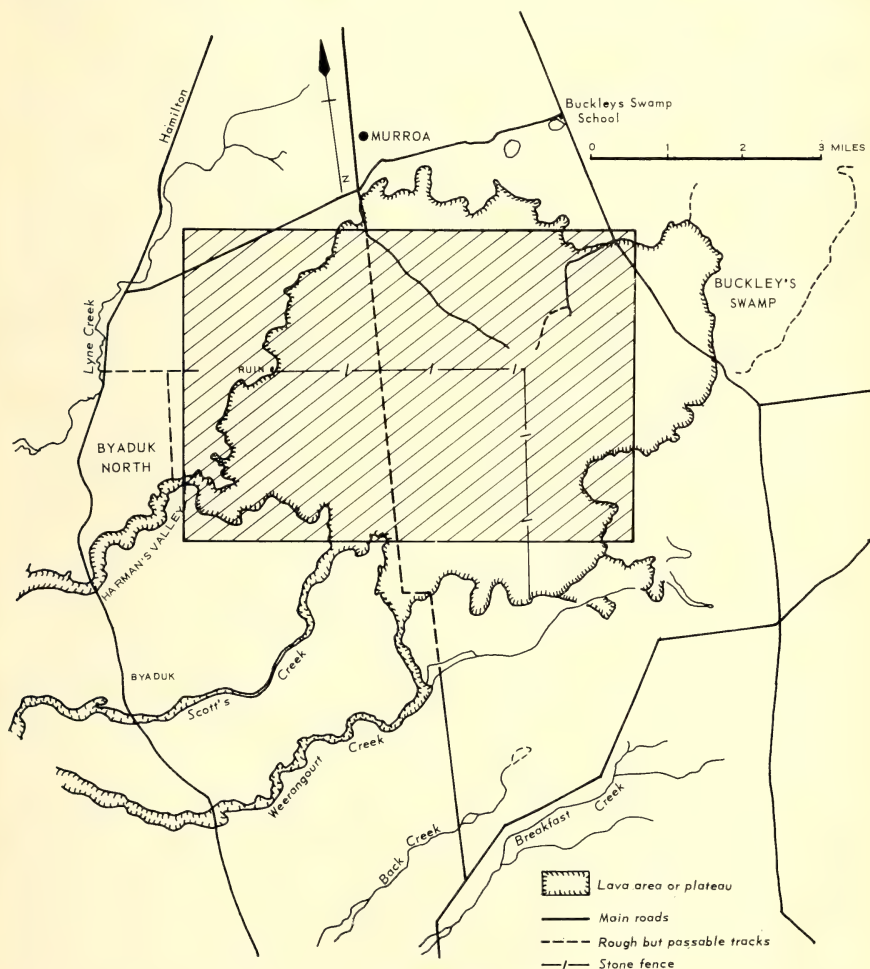


Figure 1

to be definitely viable. We therefore envisage the gradual development of an enlarged Napier National Park with a permanent staff that would largely pay for itself. It could do much good in educating children and older people on their environment, it could provide a variety of types of recreation (now recognized in U.S.A. as a necessary escape from the pressures of modern life), it could give endless pleasure to young and old, and it could provide work for many people.

The Dream

We dream a dream. We see at Mount Napier a big regional museum providing interesting information on that major section of Western Victoria, thus aiding people to understand and to love their environment. Human beings were evolved to fit into a

natural world of soil and rock and forest, and not in relation to concrete cities. It is for our health, happiness and also for our hope for the future to get back in touch with our proper environment (Gill 1970, pp. 60-65).

We dream a dream. We see a museum describing the pioneering of this country, an historical house that lets people identify themselves with their forebears of yesteryear, their struggles and their far more difficult way of life. They made the present possible.

We dream a dream. We see camping areas for young and old such as are provided, e.g. at Yosemite National Park and many smaller places in California, where the trees are not destroyed to accommodate a camp. The last figures we heard were 2,000,000 visitors a year at Yosemite, and 25,000 campers accommodated in



Figure 2

five camps, yet the natural environment is still preserved by good management. The necessary buildings are not brick/iron structures out of keeping with their environment, but buildings that naturally fit into their background.

We dream a dream. We see primi-

tive areas kept strictly in their natural state but in addition all manner of classified areas grading gradually to parks and picnic grounds, rock shelters and playgrounds. We visualise walking tracks up the mountain (down too if you wish) by various routes, bush-walks through the forests

Figure 2

Enlargement of part of Fig. 1 to show features of interest around the Mt. Napier eruption centre:

1. Scoria cone (summit 1,453 ft.) and crater.
2. Explosion crater larger than 1, 35 ch. in circumference, rim 95-125 ft. above floor, breached each side with short lava channel. Lava flows N.E. and S.E.
3. Crater wider but shallower than above, c. 13 ch. diameter. Walls 20-60 ft. high. Very mobile flow to N.E.
4. Lava tunnel, open both ends, 200 yd. below breach in crater 1. Lava stalactites. Site on line in Fig. 2 N. of 35.
- 5-6. Small lava fountain craters.
7. Eruption point — hill of scoria and basalt.
8. Very large basalt boulders, possibly hurled from 2.
9. Hill of scoria quarried by Menzel Bros.
10. "Devil's Hole" explosion crater. Height of rim 100-130 ft.
11. Hill with eruption point on one side.
12. Scoria crater on opposite (S.E.) side of same hill.
13. Scoria probably carried on surface of lava flow.
14. Four spatter craters, one with gas vents.
15. Negative structures in lava.
16. Large sinkhole formed by draining of lava.
17. Sink holes and barriers.
18. "The Great Barrier."
19. Byaduk Caves.
20. Large shallow crater (apparent eruption point), and lava flows.
21. Truncated scoria cone c. 80 ft. high with crater 50-60 ft. deep. Near cone base is smaller crater with basalt flow. A lava canal, starting as a lava tunnel 30 ft. long, can be traced for 400 yd. Natural bridge c. 50 yd. from cave. Tunnel section at bridge 16 ft. in diameter and almost symmetrical. Lava cave 60 ft. long lies parallel to canal W. of bridge. Third cave lies half way between crater lip and canal cave.
22. Slightly crescentic band of scoriaceous lava c. 150 yd. long and 40 ft. high with small cave near lowest point containing bat guano. With 200 yd. on N. side are two small shallow craters.
23. Lava canal partly covered by scoria.
24. Possible sink hole or crater covered by scoria.
25. Small lava cave near stone fence = "The Forge".
26. Two small blister caves near summit of 1 on N.W. face.
27. Point of eruption. Low hill of blocky basalt.
28. Do. Low hill of basalt and scoria.
28. Point of eruption. Low hill of basalt and scoria.
29. Shallow crater 250 yd. diameter with low scoria ring.
30. Point of eruption. Small hill of scoriaceous lava.
31. Crater c. 100 yd. wide and 40 ft. deep, 60 yd. N. of Public Reserve boundary.
32. Point of eruption. Low basalt hill.
33. Site is between 34 and 6. Massive complex dyke extending W. from near summit for 26 ch. then continuing as fissure as far again with at least four points of eruption.
34. Small crater with scoria ring.
35. Concentric lava layers between 4 and 25, and on same level.

Features in Figures 1 and 2 recognized and mapped by L. K. M. Elmore.

tracks, winding among the rock rivers formed by the volcanic flows, trails through the big lava rifts and over the miniature mountain ranges of lava that were pushed up in ridges just before they congealed into solid basalt. Trails also to the famous Byaduk lava caves and beyond to the curious collapsed features, diatom-phytolith fields, ponds and peats of the Condah Swamp. This could be elaborated in the tourist season with rides along donkey trials for children, horse trails for adults, and such like to help make the place a financial success.

In our dream we see roads which many conservationists want to keep out of National Parks. Absence of roads means that only the physically fit can enjoy the park. Why not also the old folk, and why not teach the little ones to love the Nature Parks? It is a matter of zoning, then good management. One of the impressive things at Yosemite is that you can drive great distances in comfort on asphalt roads but the roads are almost out of sight. Instead of cuttings there are (where possible) overgrown re-graded areas. In the tourist season guides are available, and many of them are scientists who teach in Universities during the year, so that the best of information is available. If a park is big and attractive enough, people will come in large numbers and it can to a large extent pay for itself. In U.S.A. there are small parks with no one in attendance (but plenty of guide posts and information labels) up to major undertakings like Yosemite.

Napier National Park

So we dream a dream of an enlarged National Park big enough to be viable, wide enough in its interests to attract large numbers of people, used as part of the regular education of thousands of school children from

100 km around, a natural history centre where farmers get help or find new interest in their area, where the history of the region is displayed, and above all where the volcanic wonderland is made an open picture book for all to read and enjoy.

A dream does not become realised overnight, but let us recognise the priceless possession we have in Mount Napier and get a programme started. Many service organizations would assist and many individuals would be glad to help build such a dream into a successful reality.

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Additions to the family Kokiriidae (Trichoptera)

by A. NEBOISS*

Abstract

The family Kokiriidae is characterized, and for the first time recorded from Australia. The New Caledonian genus *Mecynostomella* with its only species *fusca* Kimmins (1953) is transferred from the Family Sericostomatidae to Kokiriidae. *Tanjistomella verna* (new genus and species) is described from Victoria.

Introduction

The extensive collecting of insects along Victorian watercourses as part of the ecological surveys undertaken during the last two or three years has added not only interesting distributional data of caddis-flies in Victoria but also numerous entirely new species. The investigations carried out in the Latrobe River valley brought to light a very interesting new caddis-fly species belonging to the family Kokiriidae, previously unknown from Australia. Its existence in Tasmania was known to the author for several years, and the description of the three species occurring there will appear in a publication dealing with the Tasmanian fauna.

Histoy

Schmid (1955) described the genus *Rhynchopsyche* from Chile in the family Brachycentridae, but explicitly noted a certain resemblance to the Australian genus *Plectrotarsus*. McFarlane (1964) described a new monotypic genus *Kokiria* from New Zealand and placed it in a separate subfamily Kokiriinae within the family Plectrotarsidae. Ross (1967) recognized the close relationship between the Chilean *Rhynchopsyche* and the

New Zealand *Kokiria*, and joined them together to form a new family Rhynchopsychidae which he considered to be closely related to the family Lepidostomatidae. Riek (1968), in his key to the limnephiloid families, elevated the Kokiriinae to family status. The two family names are synonymous, and Kokiriidae (McFarlane, 1964) has priority over Rhynchopsychidae (Ross, 1967).

Family diagnosis

Ocelli absent; antennae about as long as the anterior wing, basal segment longer than broad but not bulbous; mouth parts elongate in the form of a proboscis; maxillary palpi cylindrical, 3-segmented in male, 5-segmented in female. Scutum and scutellum each with pair of warts. R_1 of the anterior wing curved sharply toward costa basad of pterostigma, connected or joined to Sc for a short distance before running with an even curve to the wing margin. No cross vein connecting R_1 and discoidal cell (it was erroneously shown as present by McFarlane (1964) fig. 59; this was checked and its absence confirmed by that author in personal communication). Posterior wing with discoidal cell open (aberrantly closed in some *Kokiria miharo* specimens), R_1 ending blindly, becoming untraceable distally, or joining Sc shortly before wing margin; 3-5 frenular bristles at the humeral angle.

Spurs 2:4:4 covered with fine hairs. Riek (1968) (adopted by Malicky (1973)) erroneously stated that they

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are bare; re-examination of *K. miharo* specimens revealed the opposite.

In the search for the family relationship of the Australian species, it was noticed that the New Caledonian species *Mecynostomella fusca* Kimmins (1953) has all the diagnostic characteristics of the family Kokiriidae rather than those of the family Sericostomatidae where it was originally placed. It has been described as having

striking prolonged mouth parts, 3-segmented maxillary palps in the male; ocelli absent; anterior wings with R_1 joining Sc for a short distance basad of pterostigma; and spurs 2:4:4. These key characters, together with the wing venation in general, and the basic structure of the genitalia are considered sufficient to justify transferring this monotypic genus to the family Kokiriidae.

KEY FOR SEPARATING GENERA

(Males only)

- | | |
|--|-------------------------------|
| 1. Large patch of modified hairs on the lower basal half of the anterior wing | <i>Mecynostomella</i> Kimmins |
| — Anterior wing without large patch of modified hairs on basal half | 2 |
| 2. Maxillary palp with segment 3 shorter than segment 2 | <i>Rhynchopsyche</i> Schmid |
| — Maxillary palp with segment 3 as long as or longer than segment 2 | 3 |
| 3. Discoidal cell in anterior wing very short, less than half the length of fork 2 | <i>Kokiria</i> McFarlane |
| — Discoidal cell in anterior wing long, as long as or slightly longer than fork 2 | <i>Tanjistomella</i> gen. n. |

Genus *Tanjistomella* gen. n.

Ocelli absent; mouth parts extended to a slender proboscis, which at rest is folded back beneath the head into a special groove; maxillary palp 3-segmented in male, terminal segment slightly longer than second. The head dorsally with only the posterior pair of warts present; eyes large. Pronotum with lateral warts distinctly larger than the middle pair, not touching each other. Scutum and scutellum each with a pair of elongated warts. Anterior wing with R_1 curved and connected with Sc basad of pterostigma, then diverging into concave curve toward the wing margin; discoidal cell as long as or slightly longer than fork 2; thyridial cell slightly shorter than discoidal cell; forks 2, 3 and 5 present. In posterior wing discoidal cell open; forks 1, 2 and 5 present.

Spurs 2:4:4, covered with fine hairs.

Type species: *Tanjistomella verna* gen. et sp.n.

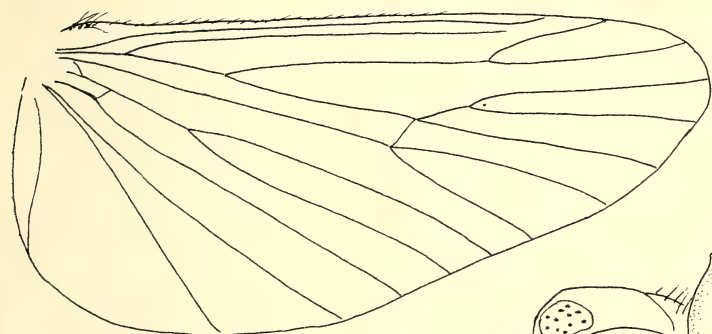
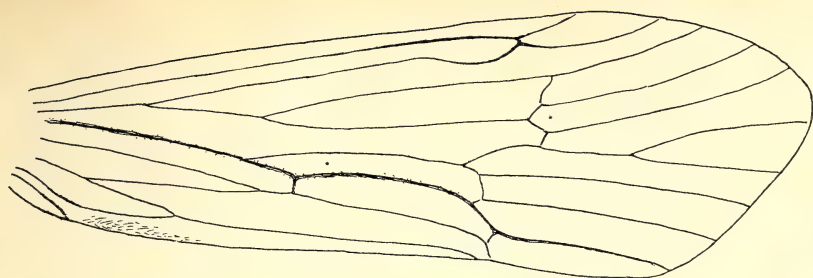
Tanjistomella verna sp. n.

Figs. 1-8.

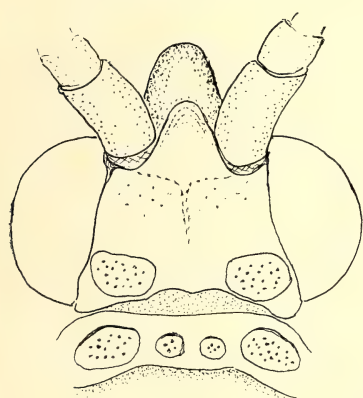
Insect of moderate size, dark brown, legs and abdomen yellowish-brown. Head rather narrow, eyes large, black; frons extended forward to a narrow distally rounded snout. Warts on scutellum narrow, elongated, almost parallel, about half the length of scutellum. Tibiae slender, evenly and densely covered with fine hairs, the posterior tibia with a few small spines; spurs slender, apically pointed, covered with fine hairs. Several small spines on tarsal segments, more so on basal than the terminal ones.

♂ genitalia with segment x produced to a narrow, posteriorly truncate lobe; superior appendages short, broad, interior angles pointed; inferior appendages single segmented, short, pointed apically; phallus terminating with a pair of large rounded dorsal lobes and a downturned finger-like median process ventrally.

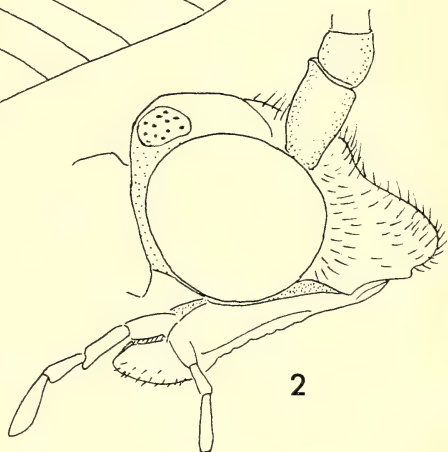
♀ unknown.



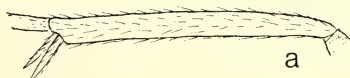
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3



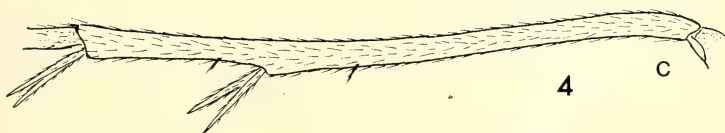
2



a



b



4

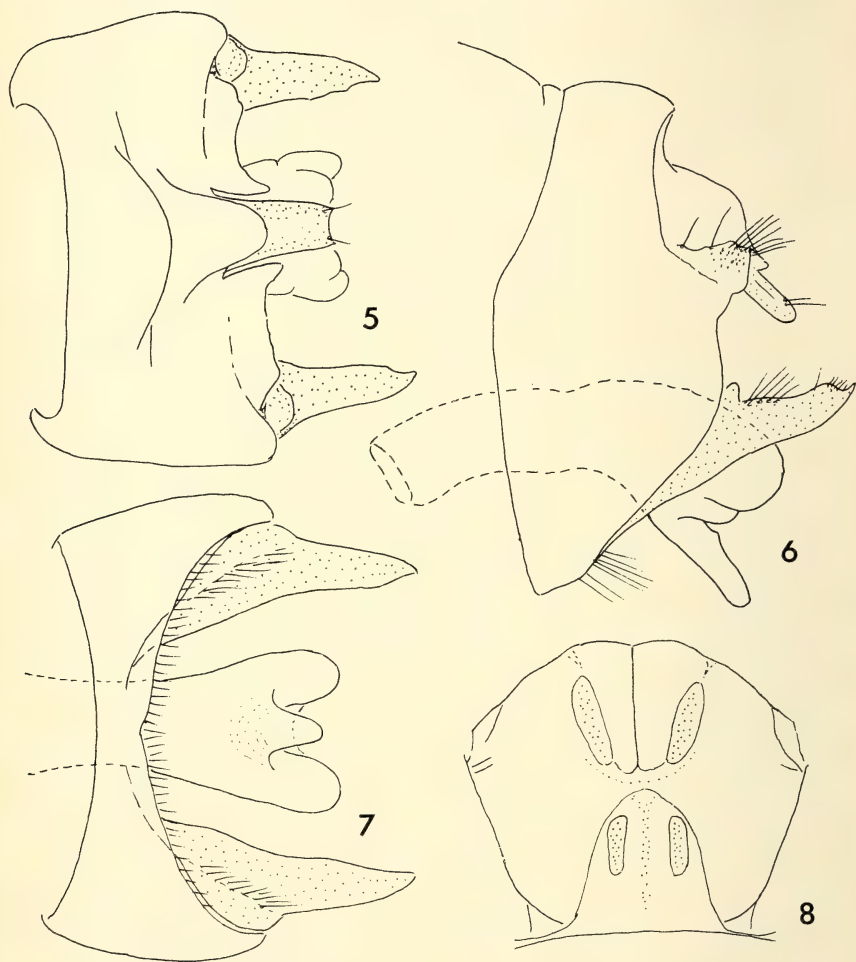
c

Length of anterior wing: ♂ 9 mm.
 Type material: Holotype ♂ (T4544), paratype ♂ (T4545) (genitalia preparation PT-446). Tanjil River, Walhalla Road, Victoria, 22 Oct. 1973. Light trap. C. McCubbin and A. Morison. Specimens pre-

served in alcohol, National Museum of Victoria.

Acknowledgements.

The author is indebted to Dr. G. Ettershank, of Monash University, Clayton, Victoria for his very helpful comments on the manuscript.



Figures 1-8

Tanjistomella verna gen. et sp. n. (1) — Wing venation; (2) — head lateral; (3) — head and pronotum dorsal; (4a) — anterior tibia, (b) — mid-tibia, (4c) — posterior tibia; (5) — ♂ genitalia dorsal; (6) — ♂ genitalia lateral; (7) — ♂ genitalia ventral; (8) — scutum and scutellum dorsal.

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Paper and Pearly Nautilus

by RHYLLIS J. PLANT*

Both the Paper and the Pearly Nautilus fall into the *Cepalopod* group, which includes squids, octopus and cuttlefish but the "shells" of each animal serve a completely different purpose.

The shell of the Pearly Nautilus is an actual shell which the animal lives in continuously and never leaves, similar to most shell bearing molluscs.

The "shell" of the Paper Nautilus is not a shell at all, but only a case made by the female in which she lays her eggs. The female grips and makes her egg-case with two flat tentacles adapted for this purpose. When no egg case is present, the animal looks rather like an octopus.

The case is not chambered, but thin, fragile and hollow. Several legends exist about the egg case; one being that they appear on the beach every seven years. This is not correct, for the currents and wind control the time at which anything is beached; also eggs would be laid more regularly than this.

The Paper Nautilus animal feeds on small animals floating on the surface, such as crustacea. Little is known about the animals' life-cycle, and until further observations are made, the above is all we know.

The common Victorian Paper Nautilus is known as *Argonauta nodosa*.

More information however is available about the Pearly Nautilus and its habits.

The shell of this animal is chambered and each separate partition has a hole in the centre (see figure 1). The animal lives in the last and biggest chamber, and as it grows, moves forward and lays down another partition behind it. A slender extension of the body remains down through the holes and serves to fill and empty the chambers with liquid which acts as a weight controller to enable the animal to sink, or float to the surface at will.

The Pearly Nautilus swim by jetting

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water through the funnel, and steer by touch only. They are carnivores, and although observations have not been made in the wild, captive animals eat fish, crabs and meat.

Animals have been found at depths of from 58 m to 240 m, and possibly deeper. These nautilus do not seem to have the ability to change colour like other octopus-type creatures.

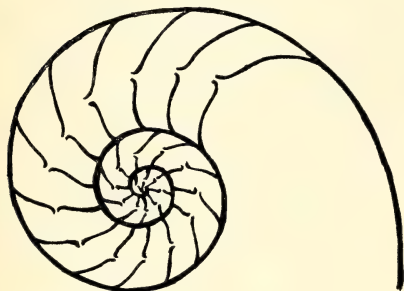


Figure 1.

Cross section of
Pearly Nautilus
showing chambers.



Figure 2.

Typical pattern of
Pearly Nautilus.

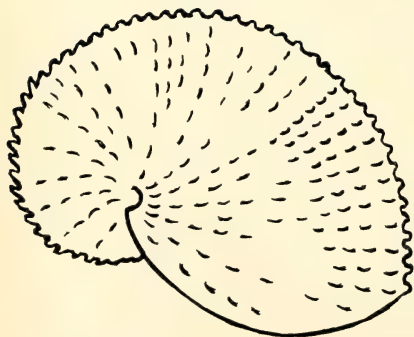


Figure 3.

Paper Nautilus.

Drawings by Author.

THE PASSING OF MR. FRANK HILL

Many members of The Field Naturalists Club of Victoria will remember Mr. Frank Hill, who was a member till two years ago. He attended all the excursions and helped whenever assistance was needed. He was a member of the Anthropological Society, the Archaeological Society and the Bread and Cheese Club. He died on the 28th April, 1974, a few weeks before his seventy-fourth birthday.

Field Naturalists Club of Victoria

General Meeting — 13 May

The speaker at the May meeting was Club member Mr. Arthur Brook, whose talk, entitled "A Day in the Life of a Frog", was another in the introductory series organized by Miss Madge Lester who also introduced the speaker. Mr. Brook devoted most of the talk to describing his studies of the Spotted Marsh Frog, which have already extended over a number of years, and have involved continuous observations over long periods. An electronic device, designed by Mr. Brook, for reproducing a frog's call, was displayed and demonstrated, creating considerable interest and amusement. It was pleasing to see a number of younger members at the meeting and their contributions to the lively question time added to the interest of the talk.

At the opening of the meeting the President announced with regret the death of Mr. Frank Hill, who had been for many years a very regular attendee at Club excursions. On a happier note Mr. Kelly reported that Mr. J. H. Willis had been appointed an Honorary Fellow in Monash University Botany Department, and also that Mr. Leigh Winsor, senior vice-president of the Club, had accepted a position in the Biological Sciences Department of James Cook University, Townsville. Mr. Winsor has been a very active Club member, particularly as convenor of the Club Improvement Committee and president of the Field Survey Group. Whilst congratulating him on his appointment Mr. Kelly expressed regret that the Club would be losing such an energetic member.

Included in the correspondence was a reply from the Minister for Conservation to a Club submission urging land acquisition to enlarge and integrate the

Bendigo Whipstick Forest Reserves. Mr. Borthwick said that the Victorian Conservation Trust was actively pursuing the matter.

A report was received from the newly-formed Club Conservation Group, who have settled on the third Thursday of the month as their regular meeting night, which this month will be in the new Conservation Council rooms at 15 Drummond Street, Carlton.

The President also reported that a record number of twenty-seven nominations had been received for this year's award of the Natural History Medallion, and that the six members of the Award Committee had commenced the big task of studying the submissions.

Exhibits at the meeting included some red algae of the family Sphaerellaceae shown under a microscope. Also on the exhibit table was a new book, "Principles of Physical Geology", by Arthur Holmes, which had been presented by Mr. Graeme Love in appreciation of the Club. The book is available on loan from the library.

Nature notes were given reporting a colony of Bell-birds near The Boulevard in Kew, and also notes and a query as to the species of phosphorescent marine invertebrate at present plentiful on the shore at Chelsea.

The book stall, which is open at the back of the hall at every general meeting, continues to do good business, and stocks have been increased to include some important reference works and specialist publications. Mr. Dan McInnes will shortly be issuing stock and price lists and would be happy to receive enquiries, particularly from country members who may not have easy access to good book shops.

FIELD SURVEY GROUP

Annual General Meeting — March 1974

At the Annual General Meeting of F.S.G., the following members were elected as the 1974-75 Committee:—

Chairman — Arthur Brook.

Secretary — Leigh Winsor.

Asst. Secretary — Rob. Sandell.

Minute Secretary — Ros St. Clair.

Records Officer — Mike Hares.

N.M.V. Rep. — Dr. Brian Smith.

Residual — Max Campbell,

Gus Fabris, Alan Burns,
Wendy Clark.

The former secretary, Linda Barraclough, has taken up duties in Bairnsdale. The group thanks Linda for her services in the club and wishes her all the best in her new position.

The chairman's address was on Micro-anatomical Methods in which Leigh Winsor outlined various techniques that could be used for microscopical studies in some animals. The meeting concluded with supper as usual.

General Meeting — April 1974

At this meeting, reports on surveys conducted in the Macalister River area, Tower Hill Reserve and Yarra Brae Dam area were prepared.

F.S.G. Camps

Recent F.S.G. camps have been held in the following areas:

January — Dargo High Plains, N.E. Victoria.

February — Mornington Peninsula.

March — Jamieson — Connor Plain Transect.

April — Dartmouth Dam Site, Bogong High Plains.

May — Whitfield area.

Notes on New Policies Formulated by

F.S.G. Committee:

(a) *Meetings*: It has been resolved that future meetings will alternate between specialist nights and meetings of general interest. Future notices of F.S.G. meetings as appear in the *Victorian Naturalist* will indicate whether the topic is specialist or general.

(b) *Camps*: Because of the low number of members attending camps, and transport difficulties, future F.S.G. camps may be held in conjunction with F.N.C.V.-M.S.G. Therefore, no notices of camps will appear in the *Victorian Naturalist* and members wishing to attend camps should obtain details of intended camps from the secretary or at an F.S.G. meeting.

Mammal Survey Group, F.N.C.V.

Camp Reports

The camp on the 26, 27, 28 January in the Barmah Forest was greatly hampered by high floodwaters, restricting access to the edges of the forest. The only native species recorded for the camp was the Brushtail Possum (*Trichosurus vulpecula*).

On the 16, 17 February the group surveyed areas of bush in the vicinity of Mt. Baw Baw. Undoubtedly the highlight of the camp was the capture of Broad-toothed Rat (*Mastacomys fuscus*), an uncommon species. Other species captured were Bush-rat (*Rattus fuscipes*), Brown Antechinus (*Antechinus stuartii*), and Dusky Antechinus (*Antechinus swainsonii*). Spotlighting added 4 more native species to the tally: Bobuck (*Trichosurus caninus*), Greater Glider (*Schoinobates volans*), Sugar Glider (*Petaurus breviceps*) and Ringtail Possum (*Pseudocheirus peregrinus*). Other wildlife of concern to the group was the large number of Copperhead snakes in the large clearing chosen as the campsite. An alternative was used, and the snakes were observed several times during the week-end, without disturbing them unduly.

On 9, 10, 11 March we visited the Mt. Pilot region, about 9 km north of Beechworth. The habitat was dry stringybark, box open forest. The 2 native species trapped were Yellow-footed Antechinus (*Antechinus flavipes*) and Bush-rat. Native mammals seen while spotlighting were Ringtail Possum and Brushtail Possum, while Black Wallaby (*Wallabia bicolor*) and Echidna (*Tachyglossus aculeatus*) were recorded from daylight sightings.

The Easter camp was spent in one of the most scenic and rugged areas of the State, around Mt. Cobbler and Mt. Speculation, and including the upper reaches of the King and Wonnangatta Rivers. The habitat varied from peppermint, candlebark forest on the King to alpine ash on the upper Wonnangatta, with extensive snow gum forest at higher altitudes. About 400 trapnights were achieved, resulting in 3 native and 1 introduced species being recorded; Bush-rat, Brown Antechinus, Dusky Antechinus and feral cat. All native specimens were released except for regional specimens returned to the Fisheries and Wildlife Department. The spotlighting at this camp was given a boost with the use of

a petrol generator for charging batteries in the field. It was built by Richard Forse and will be most useful at long camps. The spotlighting produced Greater Glider, Sugar Glider, Brushtail Possum, Ringtail Possum, Bobuck, Black Wallaby and Wombat (*Vombatus ursinus*). Although not seen, Yellow-bellied Gliders (*Petaurus australis*) were heard on several occasions, and one heavily scarred feeding tree was found. An unusual incident was the observation at close quarters of a Greater Glider sitting in the middle of the road. It had apparently landed there between two parties setting out in cars to spotlighting areas.

Marine Biology and Entomology Group

— 5 May

Thirteen members attended this meeting which, in the absence of Mr. R. Condron, was chaired by Mr. P. Kelly.

Speaker for the evening was Mr. John Zimmer, his subject being "Wing Venation in Insects". This was a subject about which members knew very little and great interest was taken by this talk on the subject.

Mr. Zimmer started by describing an insect wing as an outgrowth from the thorax which contains tubes often followed by trachae. On final emergence the wing sac expands to become a flattened structure with the veins compressed between the upper and lower membranes. The wing surface is corrugated with

some veins situated on ridges (convex), and others in furrows (concave). By studying the incidence of occurrence of locations of the major veins, Comstock & Needham (1918) arrived at a generalized wing-venation system indicating a probable common phylogenetic origin of the variety of forms we have today.

The principal veins are Rg. and Cu., which are usually strong convex veins situated on ridges. All other veins can be related to these.

In some orders extensive modification and fusion had occurred. In more primitive insects of the various orders the venation was often close to the typical original pattern. Even the complicated cellular system in wasps can be related to the Comstock-Needham system through fossil specimens. In some groups rows of bristles, or a strong fold in the membrane may indicate where a vein had disappeared, e.g. some Chalcids. Wing venation is seen in the elytra of fossil coleoptera.

The use of wing venation nomenclature is seen in identification of insects where, frequently, the arrangement and form of wing venation is used to differentiate between species of winged insects, e.g., Diptera.

Mr. Zimmer illustrated this talk with slides showing different wing venation in different species of insects.

At the conclusion of his talk, Mr. Zimmer was thanked, after many questions were asked.

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Established 1880

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 8 July — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

Speaker — Miss Madge Lester: "The Alternation of Generations in Green Land Plants."

New Members —

Mrs. E. Cochrane, 254 North Road, East Brighton, 3187 (*Botany*).

Miss Ingrid Hillman, 32 Dorrit Street, Carlton, 3053 (*Marine Biology*).

Miss Rosemary Lade, C/- 38 Uvadale Grove, Kew, 3101 (*General*).

Miss D. Moroney, 19 Lysander Street, East Brighton, 3187 (*Birds*).

Mr. Neville Rosengren, Dept. of Geography, University of Melbourne, Parkville, 3052.

Ordinary:

Mr. Anthony J. Rough, 199 Elder Street, Greensborough, 3088 (*Animals*).

Mr. Robert Simmons, 5 Backous Way, Noble Park, 3174 (*Field Survey, Mammal Survey*).

Joint:

Mrs. Denise Purdue, 4/372 Toorak Road, South Yarra, 3142 (*Mammal Survey*).

Country:

Dr. P. R. Bird, 133 Lonsdale Street, Hamilton, 3300.

Mr. B. H. Vardy, Maiden Gully P.O., Vic. 3550.

GROUP MEETINGS

Thursday, 11 July — Botany Group, speaker Mr. Rex Filson, "Lichens".

Wednesday, 17 July — Microscopical Group Meeting.

Thursday, 18 July — Conservation Group Meeting at 15 Drummond Street, Carlton, at 8.00 p.m.

Thursday, 18 July — Day Group Meeting. Meets at the Great Hall of the Arts Centre at 1.30 p.m. for a guided inspection.

Thursday, 25 July — F.S.G. Meeting in Conference Room, National Museum, at 8.00 p.m.

Thursday, 1 August — M.S.G. Meeting at Arthur Rylah Institute, 123 Brown Street, Heidelberg, at 8.00 p.m.

Monday, 5 August — Marine Biology and Entomology Group Meeting in Conference Room, National Museum at 8 p.m.

Wednesday, 7 August — Geology Group Meeting.

Thursday, 8 August — Botany Group, "Looking at Nature — Winter", Mrs. Ilma Dunn (note that this will be before the August General Meeting).

F.N.C.V. EXCURSIONS

Sunday, 21 July — Sherbrooke Forest and Lyrebirds: Leader — Margaret McKenzie. Coach leaves Batman Ave., 9.30 a.m. Bring one meal. Fare \$2.00.

Saturday, 27 July — Botany Group excursion, "Lichens in the Field", leader Rex Filson.

Sunday, 1 September, to Sunday, 8 September — Kangaroo Island. The balance of the payment for this excursion (\$135 less deposit already paid) should be forwarded to the excursion secretary by 8 July, and members requiring berths on the train leaving Melbourne, Saturday evening, 31 August, should send the train fare in addition. Sleepers per person \$32.07, or first class seats \$21.67. Members wishing to extend their stay in Adelaide should indicate this. It is necessary to travel in a group on the forward journey to obtain this concession but not necessary to return together. Those not travelling by train should meet at Adelaide Railway Station at 8.45 a.m., where the bus will wait for the members arriving on the Overland and take the party to Mt. Lofty and Cleland Wildlife Reserve, then on to the Adelaide Airport by 3.15 p.m. to board the plane to Kangaroo Island. See earlier **Naturalists** for other details. All cheques should be made out to Excursion Trust.

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Cover Photo:

- The male of the Gum Emperor Moth,
showing the intricate construction of
the antennae.

Photo: Graham Pizey.

It is with regret that this issue is reduced to 24 pages. Cost rises have reached such a scale that it became essential to make savings somewhere. Council has therefore decided that except where necessary for some special purpose future editions of the "Victorian Naturalist" will be the same reduced size as this one.

Some two years ago a motion was passed at a members' night calling for complete revision of the Club By-laws and its Articles of Association. This mammoth task was referred to the Club Improvement Committee. Recommendations for revision of the By-laws were submitted to Council some time ago. After further slight modification a new set of By-laws were adopted. These have now been typed, and will shortly be published. It is realised that those who called for this to be done expected it would be carried out much sooner. It is hoped when they see the new set of By-laws and realise that every item in them has been subjected to detailed scrutiny, and in many cases repeated re-writing, just how much voluntary time and effort has gone into this job. It is because of the care with which they were examined that it has taken so long to update them. The few changes recommended for the Articles will, it is hoped, be ready for implementation at the next annual meeting.

An Aboriginal Camp Site at Portsea Victoria

by A. E. SPILLANE

Illustrations by A. E. Spillane.

Portsea, Victoria, is situated a few kilometres from Point Nepean, on the Mornington Peninsula. Long white breakers thunder ashore on to its magnificent surf beaches that face Bass Strait; while sparkling seas, brought in from the Strait with each new tide, play upon its golden sands that fringe Port Phillip Bay.

It is an area steeped in history; not far away is Sullivan Bay, where in 1803, Colonel David Collins established Victoria's first settlement.

Discovery of the camp site

In 1963, Mr. K. G. Begg, purchased "Warrener", a 3.237 hectare property on the Portsea Downs Estate, for the establishment of a carnation farm. The property is situated in Elizabeth Avenue, roughly halfway between Port Phillip Bay, and Portsea Back Beach. Mrs. Begg, being very interested in natural history, was intrigued with the number of sea shells scattered around the area; and after finding several stone artifacts, realized that a large former Aboriginal camp site had been discovered.

Natives of the Bunurong tribe inhabited the Peninsula at the time of the arrival of Collins and his party; and presumably, it would have been people from that tribe who used the site at Warrener.

It is not difficult to imagine why the natives occupied this particular camp. The area consists of undulating land, made up of Pleistocene sands; it is nicely cupped, and consequently would have been used for sheltering from cold winds during inclement weather. Nearby, are several high vantage

points, from which they could have observed their game, and kept a lookout for enemies. The site possesses a waterhole, that still contains water in summer.

At the time of the landing of Collins, the area abounded with native animals, such as Emus and Kangaroos, traditional sources of food for the Aborigines. Also, being so near Bass Strait and Port Phillip Bay, shellfish and fish would have been plentiful.

The midden

Upon moving soil on the property, for the erection of buildings; very large quantities of sea shells were revealed, indicating that the midden must have been used for a very long period of time.

Some of the shells recovered from the midden, included Ophione Hidden Bubble Shell (*Lamellaria ophione*), Duckbill (*Scutus antipodes*), Common Mud Oyster (*Ostrea angasi*), Mussel (*Mytilus planulatus*), Warrener (*Subnella undulata*), Dog Winkle (*Dicathais textilosa*), and Tall-ribbed Limpet (*Patelloida alticostata*).

A fascinating discovery from one section of the midden, was a quantity of Emu egg pieces.

Although old kitchen middens have been found in various localities on the Peninsula, permanent camp sites similar to Warrener are rare. The number, and types of artifacts found, indicate that it was a major site. Its discovery is of special significance, because it was at this type of camp, that native craftsmen manufactured the more specialized types of stone tools, that were so necessary for the general well-being of the tribe.

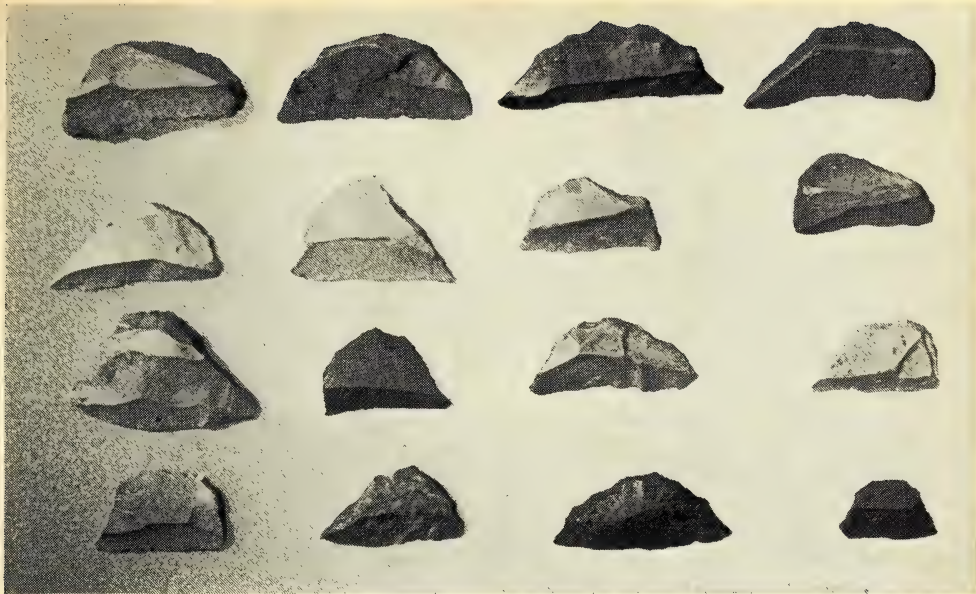


Plate 1. Geometric microliths from Warrenner.

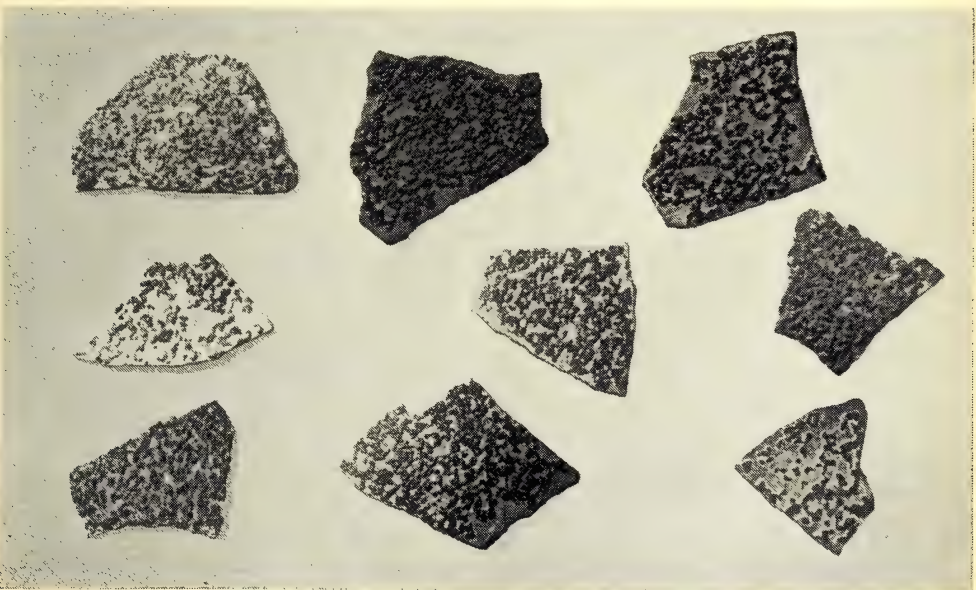


Plate 2. Pieces of Emu egg from the midden at Warrenner.

Stone implements

Since discovering the first artifacts, Mrs. Begg has collected assiduously on the site; and today possesses an outstanding collection of stone implements, ranging from beautifully made microliths, to crude knapped pebble axes.

Pride of the collection is a very large array of geometric microliths, the "mystery stones" of the Aborigines. Included in this group are segments, triangles, and trapezes; ranging in size from 10 to 30 millimetres.

Bondi points are represented by a very fine range; the largest specimen is 43 millimetres in length.

There is also a collection of micro "thumbnail" and end scrapers; the largest implement in the first group, is 20 millimetres in diameter.

The main types of stone used in the manufacture of the above implements, were tachylite, jasper, fine grained quartzite, and chert.

Until comparatively recently, microlithic implements were a puzzle, as even present day Aborigines were unsure of their functions. However, in recent years, archaeologists working at several sites in Australia, have found microliths with resin still adhering to them, which suggests that perhaps some of them were used as spear barbs. A number of them are still a puzzle; it is hard to imagine what the diminutive segments, only 10 millimetres in length, could possibly have been used for. Perhaps they were set in wooden handles, and used as engraving tools for carving intricate patterns on wooden implements.

Another interesting find, was a hammerstone; it is 76 millimetres long, with depressions on each side, suggesting that it had also been used as an anvil (Plate 5).

The knapped pebble axe (Plate 6) is basalt, and is characteristic of the type usually found on Peninsula camp sites; it is 97 millimetres long.



Plate 3. Points from Warren.

The large amount of artifacts collected by Mrs. Begg, is a tribute to her perserverence, and unflagging interest in the Stone Age people, who once inhabited this delightful part of Victoria.

ACKNOWLEDGEMENT:

I am indebted to Mrs. Begg for her kindness in placing at my disposal, for the purposes of inspection and photography, all of the artifacts collected at Warrener.

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Plate 4. Thumbnail and end-scrapers from Warrener.

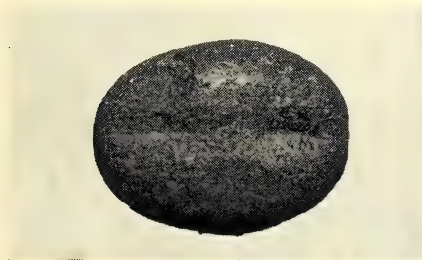


Plate 5
 Hammerstone from Warrener.

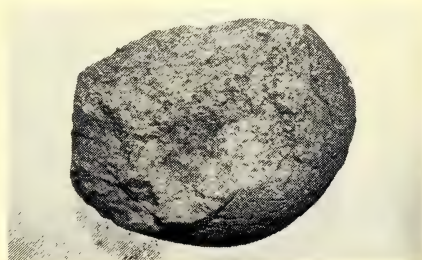


Plate 6
 Knapped pebble axe from Warrener.

reptiles of victoria - 13

by HANS BESTE

Plate 25

Lialis burtonis — Burton's Legless Lizard

A large snake-like lizard, with a wide distribution.

Length — to over 2 feet.

A large lizard, easily identified by its pointy head and eyes, which have vertical slit-like pupils. Colour variable, from dark brown to grey, with bold markings. Usually grey in this state with horizontal lines of brownish spots. Under light grey to pink. Ear opening distinct. Rudimentary hindlegs present in form of movable flap, lying along body.

Habitat — in different types of habitat from mallee areas to coast; hides among *Triodea* bushes in desert areas, when it is hard to observe.

Best distinguishing features — from snakes — ear opening, rudimentary hindlegs, dentition. As species — eyes, shape of head.

Plate 26

Phyllodactylus marmoratus — Marbled Gecko

Probably the most common gecko in this state.

Length — to 5 inches.

This medium size gecko is usually some basic shade of chocolate-brown to purplish-brown, with a darker marbled pattern, covering the upper surface. Orange spots on both sides of the tail are often present, especially in smaller specimens. Can assume almost translucent appearance when subjected to bright daylight. Feet very distinctive, with large enlarged toe pads.

Habitat — under debris and bark.

Best distinguishing features — general appearance, toes.

*Phyllodactylus
marmoratus*
Toe
Structure



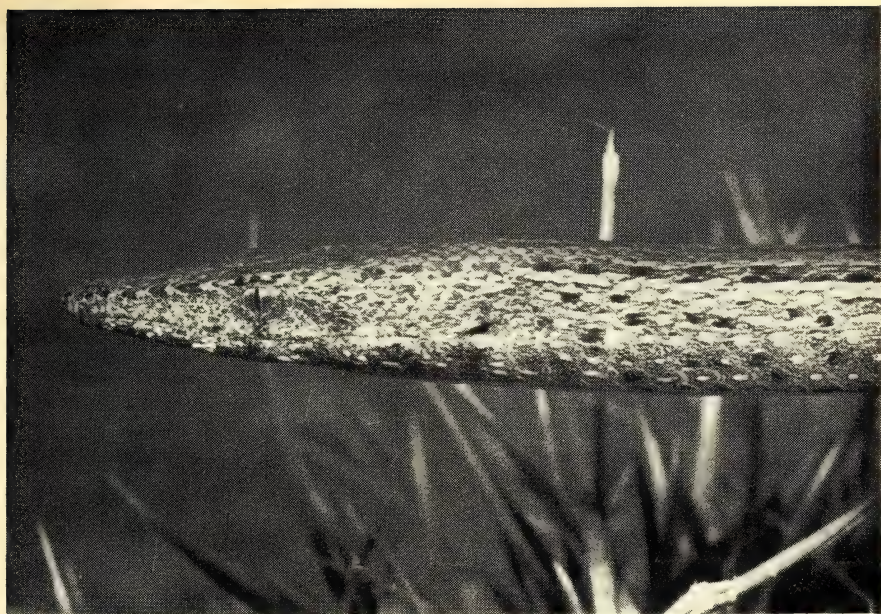


Plate 25

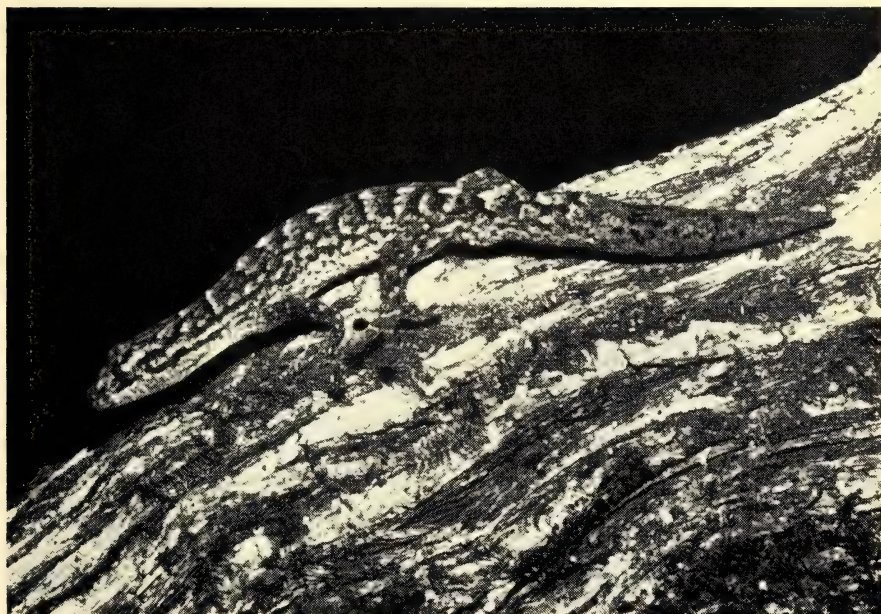


Plate 26

Bird Notes from F.N.C.V. Trip to Warrumbungles

August – September, 1973

by DOROTHY DAWSON

Tocumwal

A party of Pied Currawongs (*Strepera graculina*) with their inimitable calls jockeyed for positions on a tree trunk log extending out into the river.

Black-chinned Honeyeaters (*Meliphreptus gularis*) and Striated Thornbills (*Acanthiza lineata*) fed busily in the Red Gums along the river. Two Grey Thrushes (*Colluricincla harmonica*) called beautifully; together with a Golden Whistler (*Pachycephala pectoralis*).

Swimming upstream were a pair of Grey Teal (*Anas gibberifrons*), with fifteen young ones who skittered rapidly across the surface of the water, and kept up easily with the parent birds against the strong flowing current. A couple of Yellow Rosellas (*Platycercus flaveolus*) were also recorded.

With the season being an exceptionally wet one, water lay everywhere, and water birds were plentiful along our route. Those listed included White Ibis (*Threskiornis molucca*), Straw-necked Ibis (*Threskiornis spinicollis*), White-faced Heron (*Ardea novae-hollandiae*), White-necked Heron (*Ardea pacifica*), Yellow-billed Spoonbill (*Platalea flavipes*), Plover (*Lobibyx novae-hollandiae*), Stilts (*Himantopus leucocephalus*), Chestnut-breasted Shelduck (*Casarca tadornoides*) and Black Duck (*Anas superciliosa*).

Finley

Reedbeds within Finley itself were made gay with the cheerful calls of Reed Warblers (*Acrocephalus aus-*

tralis); Dusky Moorhen (*Gallinula tenebrosa*), Eastern Swamphe (Porphyrion melanotus) and Coot (Fulica atra) were also in the same area.

Just outside the Motel Little Friarbirds (Philemon citreogularis) and White-plumed Honeyeaters (Meliphaga penicillata) were active in a flowering eucalypt, as were many Silvereyes (Zosterops lateralis).

Nankeen Kestrels (Falco cenchroides) were numerous, and this useful species of hawk was seen to advantage as the miles went by. Crested Pigeons (Ocyphaps lophotes), Red-rumped Parrots (Psephotus haematonotus) and Eastern Rosellas (Platycercus eximius) were also recorded regularly.

Galahs (Kakatoe roseicapilla), though commonly seen, either feeding in the paddocks, flying in flocks or in ones and twos overhead, always delighted with their lovely silver and rose plumage.

Ardlethan — West Wyalong — Forbes — Parkes

Birds added to our list along this stretch included Noisy Miners (Myzantha melanocephala), White-rumped Miners (Myzantha flavigula), Ringneck Parrots (Barnardius barnardi), White-winged Chough (Corcorax melanorhamphus) and Brown Hawk (Falco berigora).

Dubbo — Sanctuary

Several varieties of Grevillea were in flower, and many species of honeyeater busily sought the nectar provided. They included Fuscous

(*Meliphaga fusca*), White-plumed (*M. penicillata*), White-eared (*M. leucotis*), Yellow-faced (*M. chrysops*), Spiny-cheeked (*Acanthagenys rufogularis*).

As we reluctantly prepared to leave this pleasant spot, that little gem the male Mistletree-bird (*Dicaeum hirundinaceum*), was seen perched on a bare branch.

Coonabarabran — Baradine —

Gemstones Area — Apex Lookout

Further additions to the Bird List were Sulphur-crested Cockatoos (*Kakatoe galerita*), Chestnut-tailed Thornbills (*Acanthiza uropygialis*), Sacred Kingfisher (*Halcyon sanctus*), Dusky Wood-swallow (*Artamus cyanopterus*), White-naped and Brown-headed Honeyeaters (*Melithreptus lunatus* and *M. brevirostris*), Grey Fantail (*Rhipidura fuliginosa*), Yellow Robin (*Eopsaltria australis*) and the Brown Flycatcher (*Microeca leucophaea*) generally known as Jacky Winter.

Recorded in the Gemstones area were Pied and Grey Butcher-birds (*Cracticus nigrogularis* and *C. torquatus*), Apostle-birds (*Struthidea cinerea*), Cockatiel (*Leptolophus hollandicus*), Grey-crowned Babblers (*Pomatostomus temporalis*), Little Grebe (*Podiceps novae-hollandiae*), Black Cormorant (*Phalacrocorax carbo*), Welcome Swallow (*Hirundo neoxena*), Kookaburra (*Dacelo gigas*).

Birds from Apex Lookout area included Red-capped Robin (*Petroica goodenovii*), Fantailed Cuckoo (*Cacomantis pyrrhophanus*), Brown Tree-creeper (*Climacteris picumnus*), White-throated Treecreeper (*Climacteris leucophaea*).

Sandstone Caves Area

Seen here were Red-winged Parrot (*Aprosmictus erythropterus*), Rufous Whistler (*Pachycephala rufiventris*), Grey Thrush (*Colluricincla harmonica*), and Wedge-tailed Eagle

(*Aquila audax*) soaring high in the air with tip-tilted wings. Orange-winged Sittellas (*Neositta chrysoptera*), Brown Weebill (*Smicrornis brevirostris*), Little Thornbill (*Acanthiza nana*) were also recorded.

Walking around the Sandstone Caves bird song was all around, and the first sighting for the trip of Double-barred Finches (*Stizoptera bichenovii*) was made. These finches, in flocks of 30 or more individuals, were subsequently seen many times around Coonabarabran.

From among purple showers of flowering Hardenbergia came the tremulous notes of Fairy Wrens, and investigation afforded splendid views of both the Purple-backed Wren (*Malurus assimilis*) and the Superb Blue Wren (*Malurus cyaneus*).

One member of our party observed a Blue-faced Honeyeater (*Entomyzon cyanotis*) feeding nestlings.

Warrumbungles

Black-backed Magpies (*Gymnorhina tibicen*) were nesting in the Park, and the birds attacked all who went near the vicinity of their nest — two of our members came in for some vicious dive-bombing, in one instance drawing blood from injury to an ear lobe.

A party of twenty Spotted Pardalotes (*Pardalotus punctatus*) feeding on the ground near a camp tent was a charming sight, and viewers were able to approach within a few feet of these colourful little birds.

via Mendooran to Wellington

Recorded in this area were Yellow-plumed Honeyeater (*Meliphaga ornata*), Black-shouldered Kite (*Elanus notatus*), Emu (*Dromaius novae-hollandiae*), Singing Honeyeater (*Meliphaga virescens*), Little Lorikeet (*Glossopsitta pusilla*), Peaceful Dove (*Geopelia placida*), Olive-backed Oriole (*Oriolus sagittatus*), Fairy Martins (*Hylochelidon ariel*), Musk Duck

(*Biziura lobata*), Little Black Cormorant (*Phalacrocorax sulcirostris*).

Arboretum and Burrendong Dam

The Pallid Cuckoo (*Cuculus pallidus*), Western Warbler (*Gerygone fusca*), Little Falcon (*Falco longipennis*), Pipit (*Anthus australis*), and Restless Flycatcher (*Seisura inquieta*) were all recorded here. A White-winged Chough (*Corcorax melanorhamphus*) was observed sitting on its bowl-shaped mud nest.

Stuart Town — Orange — Bathurst

Crimson Rosella (*Platycercus elegans*), Magpie-lark (*Grallina cyano-leuca*), Banded Plover (*Zonifer tricolor*), Maned Goose (*Chenonetta jubata*), and Black-faced Cuckoo-shrike (*Coracina novae-hollandiae*) were all listed from these towns.

Canberra—Tidbinbilla Fauna Reserve

As we listened to a recorded talk by the Ranger of the Reserve, we saw through the long glass windows, just outside the building, Flame Robins (*Petroica phoenicea*), Red-browed Finches (*Aegintha temporalis*), Pipit (*Anthus australis*), Superb Blue Wrens

(*Malurus cyaneus*), Crimson Rosellas (*Platycercus elegans*), and Yellow-tailed Thornbills (*Acanthiza chrysorrhoa*) — a delightful combination of our feathered friends. Observed at other times were Chestnut Teal (*Anas castanea*), White-eyed Duck (*Aythya australis*), Pink-eared Duck (*Malacorhynchus membranaceus*), Black Swans (*Cygnus atratus*) nesting and with cygnets, and a Cape Barren Goose (*Cereopsis novae-hollandiae*).

White-browed Scrub Wrens (*Sericornis frontalis*), Striated Thornbills (*Acanthiza lineata*), and Wedge-tailed Eagles (*Aquila audax*) were also seen.

Canberra Botanic Gardens

From these gardens the following birds were observed: Eastern Spinebill (*Acanthorhynchus tenuirostris*), Crescent Honeyeater (*Phylidonyris pyrrhoptera*), Yellow-winged Honeyeater (*Meliornis novae-hollandiae*) and a Bronzewing Pigeon (*Phaps chalcoptera*).

NOTE: Scientific names taken from Cayley's "What Bird is That?" (revised edition) and Brigadier Hugh R. Officer's "Australian Honeyeaters" and "Australian Flycatchers".

APPENDIX 1.

WARRUMBUNGLE NATIONAL PARK

BIRD LIST

Common Bronzewing Pigeon
Crested Pigeon
Spur-winged Plover
Wedge-tailed Eagle
Whistling Eagle
Black-shouldered Kite
Little Falcon
Brown Hawk
Nankeen Kestrel
Sulphur-crested Cockatoo
Galah
Crimson Rosella
Eastern Rosella
Red-rumped Parrot
Turquoise Parrot
Laughing Kookaburra
Golden Bronze Cuckoo
Welcome Swallow
Tree Martin

Phaps chalcoptera
Ocyphaps lophotes
Lobibyx novae-hollandiae
Aquila audax
Haliastur sphenurus
Elanus notatus
Falco longipennis
Falco berigora
Falco cenchroides
Kakatoe galerita
Kakatoe roseicapilla
Platycercus elegans
Platycercus eximius
Psephotus haematonotus
Neophema pulchella
Dacelo gigas
Chalcites plagosus
Hirundo neoxena
Hylochelidon nigricans

Jacky Winter
 Hooded Robin
 Southern Yellow Robin
 Grey Fantail
 Willie Wagtail
 Golden Whistler
 Rufous Whistler
 Grey Shrike-thrush
 Magpie-lark
 Black-faced Cuckoo-shrike
 Little Cuckoo-shrike
 Brown Weebill
 Striated Thornbill
 Buff-tailed Thornbill
 Yellow-tailed Thornbill
 Superb Blue Wren
 Purple-backed Wren
 Dusky Wood-swallow
 White-browed Scrub Wren
 Orange-winged Sittella
 Brown Tree-creeper
 White-throated Tree-creeper
 Mistletoe-bird
 Spotted Pardalote
 Silvereye
 White-naped Honeyeater
 Brown-headed Honeyeater
 Eastern Spinebill
 Fuscous Honeyeater
 Yellow-faced Honeyeater
 White-eared Honeyeater
 Yellow-tufted Honeyeater
 White-plumed Honeyeater
 Noisy Miner
 Red Wattle-bird
 Spiny-cheeked Honeyeater
 Noisy Friar-bird
 Little Friar-bird
 Diamond Firetail
 Red-browed Finch
 Olive-backed Oriole
 Starling (intro.)
 Raven
 Pied Currawong
 Black-backed Magpie

Microeca leucophaea
Petroica cucullata
Eopsaltria australis
Rhipidura fuliginosa
Rhipidura leucophrys
Pachycephala pectoralis
Pachycephala rufiventris
Colluricincla harmonica
Grallina cyanoleuca
Coracina novae-hollandiae
Coracina robusta
Smicrornis brevirostris
Acanthiza lineata
Acanthiza reguloides
Acanthiza chrysorrhoa
Malurus cyaneus
Malurus assimilis
Artamus cyanopterus
Sericornis frontalis
Neositta chrysoptera
Climacteris picumnus
Climacteris leucophaea
Dicaeum hirundinaceum
Pardalotus punctatus
Zosterops lateralis
Melithreptus lunatus
Melithreptus brevirostris
Acanthorhynchus tenuirostris
Meliphaga fusca
Meliphaga chrysops
Meliphaga leucotis
Meliphaga melanops
Meliphaga penicillata
Myzantha melanocephala
Anthochaera chrysoptera
Acanthagenys rufogularis
Philemon corniculatus
Philemon citreogularis
Zonaeginthus guttatus
Aegintha temporalis
Oriolus sagittatus
Sturnus vulgaris
Corvus coronoides
Strepera graculina
Gymnorhina tibicen

More Honours for Jim Willis

I noted that in the most recent issue of the taxonomic journal "Persoonia" 7 (4) 443-581, in his work entitled "Studies in the genera *Irpex* and *Steccherinum*", that the author R. A. Maas Geesteranus in 1974 has published on page 527 of this work, the species entitled *Steccherinum willisii* n.sp. which he states is named after Mr. J. H. Willis (South Yarra, Australia), indefatigable contributor of interesting fungi.

DR. D. M. CHURCHILL,
 Director and Govt. Botanist,
 Royal Botanic Gardens, Melb., Aust.

The Origin of Generic Names of the Victorian Flora

Part 2—Latin, Greek and Miscellaneous

[continued from 91 (6)]

by JAMES A. BAINES.

Calotis. Gk kalos, beautiful; ous, otos, an ear; alluding to the two ear-shaped pappus-scales of *C. cuneifolia*, Blue Bur-daisy or Bindi-eye. We have eight species.

Caltha. Gk kalathos, a goblet; alluding to the form of the flower (A. T. Johnson & H. A. Smith); Lat. name for a plant with a yellow flower (W. T. Stearn and A. W. Smith).

***Calycotome.** Gk kalyx (genitive kalykos), a calyx or cup (chalice comes from the same word); tome, a part left after cutting; a cut; in these deciduous shrubs the upper part of the calyx dropping after the flower opens. **C. spinosa* is Spiny Broom.

Calystegia. Gk kalyx, cup or calyx; stegon, cover; with reference to the large bracts concealing the calyx. Formerly included in the genus *Convolvulus*, as established by Linnaeus in 1753, Robert Brown's 1810 name is used for our three native species, which are cosmopolitan, both genera being known as bindweeds. **C. silvatica*, Greater Bindweed, is introduced.

Calytrix. Gk kalyx, calyx, thrix, a hair; the divisions of the calyx ending in long bristling hairs. This name is a good example of the paramountcy of priority of nomenclature: Labillardière spelt it *Calytrix* (1806), De Candolle "improved" the Greek with *Calythrix* (1828), a spelling variant still seen in some of the literature, Meissner combined the two elements as *Calycothrix* (1838) and Schauer reversed their order in *Trichocalyx* (1840). All of these are now *Calytrix*, our three species of which are

known as Fringe-myrtles. (Cf. the derivations given under *Callitriche* and *Callitris*.)

***Camelina.** Gk khamai, on the ground; linon, flax; the plants sometimes grow in flax fields, and the common name of **C. sativa*, our species, is False Flax or Gold of Pleasure. It is used as a source of fibre in southern Europe, hence the name *sativa*, which means sown or planted for crops.

Capsella. Lat. capsula, box, with the diminutive -ella added; the "little box" being the seed-pod that gives the introduced weed, **C. bursa-pastoris* the common name of Shepherd's Purse, which is a literal translation of the specific name. (The usual Latin word for little box was capsula, hence our word capsule, a term also used in botany.) Our other species, *C. pilosula*, Hairy Shepherd's Purse, is native.

Cardamine. Gk kardamine, the name given by the ancient Greek botanist Dioscorides for a species of cress. Victoria has five native species, all known as different kinds of Bitter Cress, in addition to the introduced **C. hirsuta*, Common Bitter-cress. The spice cardamom got its name from Lat. cardamomum, formed from Gk kardamon, cress, plus Amomum, the ginger-family plant whose capsules provide this spice. *Cardamine* is in the family Cruciferae.

***Cardaria.** From Gk kardia, heart, referring to the cordate pods. **C. draba*, Hoary Cress, was long known as *Lepidium draba*, the specific name probably coming from the cruciferous genus *Draba*, Gk drabe meaning

acid, bitter, from the taste of the leaves.

***Carduus.** Lat. *carduus*, thistle, from Gk *kardos*, of same meaning. Slender Thistle and Musk or Nodding Thistle are our two introduced species.

Carex. The classical Lat. name for sedges. Victoria has 30 species, of which 26 are native, including the peculiarly named *C. iynx*, the specific name being the Gk name of the bird known as the wryneck, which has the habit of writhing the neck and head.

Carpha. Gk *karphe*, a splinter, twig, chaff, straw; no doubt named because of the plumose hypogynous bristles. Our two species, both native, are known as Flower-rushes.

Carpobrotus. Gk *karphe*, fruit; *bro-*tos, edible; **C. edulis* literally (and tautologically) meaning "the eatable, edible fruit", its common name, Hot-tentot Fig, proving that it was acceptable to the palate in South Africa. Our other introduced species, **C. aequilaterus*, is known as Angled Pigface, and we have two native species also. All were formerly included in *Mesembryanthemum*.

***Carrichtera.** The entry in Part 1 should be supplemented by this addendum: Named after Dr. Bartholomaeus Carrichter, of Reckingen, Germany, who was personal physician to Kaiser Maximilian II and Ferdinand I, and author of "Kraeuterbuch", an astrological herbal, i.e. all plants are listed under various signs of the Zodaic . . . not such an obscure character after all!

***Carthamus.** Arabic *quartam*, Safflower, *C. tinctorius* (according to Jaeger); from an Arabic word meaning to paint — an allusion to the brilliant saffron colour yielded by the plants (according to Smith and Stearn).

Cassia. Gk name of the leguminous plants that provide the senna leaves and pods used by pharmacists. Cassia was the latinized form of the Gk *kassia* used by Linnaeus in 1753 when naming the genus. Only two of Victoria's four recorded species are reasonably widely distributed, because these are plants of the hot inland areas. They are in family *Caesalpiniaceae*, formerly regarded as merely a subfamily of *Leguminosae* (like *Mimosaceae* and *Papilionaceae*).

Cassytha. Formed by Linnaeus from Gk *kasytas* or *kadytas*, the classical name of a parasite supposed to be Dodder (*Cuscuta*), to which these plants bear a strong resemblance, superficially, our four species of Dodder-laurel being in family *Lauraceae*, whereas the true Didders are in a family of their own, *Cuscutaceae*, named after the genus.

Casuarina. Lat. *casuarinus*, like a cassowary (*Casuarus*), because the long, drooping branches resemble the feathers of this bird. The word cassowary came into the English language in 1611 from the Malay name, *kasuari*, and *Casuarina* was named by Linnaeus (ex Adanson) in 1763. Victoria has nine species, various kinds of she-oaks, as well as Bull-oak and Belar. The species widely spread beyond Australia, *C. equisetifolia*, has a specific name meaning "with leaves like *Equisetum*", Horsetail, literally horse bristle.

***Catapodium.** Gk *kata*, down, downwards, inferior; *pous*, *podos*, foot; put in the form of a Latin neuter noun. **C. rigidum*, Fern Grass or Rigid Fescue, has been included, in turn, in *Poa*, *Festuca*, *Scleropoa* and *Catapodium*.

Caustis. Gk *kaustikos*, burning (from which our adjective caustic comes); probably from a burning taste

when sampled (the test of taste is often used by botanists as an aid to determination of plant specimens). *C. flexuosa* gets its common name, Curly-wig, and its specific name, from the ultimate branches, which Willis describes as "extremely flexuose, usually coiled in almost a complete circle". Our other two species are known as Twist-rushes.

Celastrus. Gk *kelastros*, from *kelatron*, used by Theophrastus (died c. 287 B.C.) in his works "History of Plants" and "Theoretical Botany" for either privet (according to Jaeger), an evergreen tree (Smith and Stearn) or ivy (Gilbert-Carter). Staff Climber, our native species, is *C. subspicatus*, but the old world species known as Bittersweet has not been naturalized here. The genus gives its name to the family Celastraceae.

***Celsia.** Named by Linnaeus after Olaf Celsius (1670-1756), professor of theology and Oriental languages at Uppsala in Sweden, who was also a botanist (an authority on the plants of the Bible), teacher and financial helper of Linnaeus in his student days. He was the uncle of Anders Celsius (1701-1744), primarily an astronomer, but chiefly known to fame (especially in these days of metrication) from the Celsius thermometer, which he described in 1742 as the centigrade thermometer. **C. cretica*, our introduced species, is Cretan Mullein, the true mulleins being in the genus *Verbascum*. (Omitted from Part 1, so included here.)

***Cenchrus.** Gk *kenchros*, millet, anything in small grains, seeds. **C. pauciflorus* is Spiny Bur-grass, known in U.S.A. as Field Sand-bur.

Centaurea. Gk *kentauros*, a centaur (half man, half horse); originally the word meant piercer or spearman, and

was applied to a race of savage horsemen, dwelling between Pelion and Ossa in Thessaly, extirpated in a war with their neighbours the Lapithae, their horses appearing to be part of them giving rise to the mythical creatures called Centaurs. The plant called *kentaureion* by Hippocrates (after Chiron the centaur, who had great knowledge of herbs, and was said to have discovered it, and to have used it to heal a wound in his foot inflicted by Hercules with an arrow) is known botanically as **Centaurium minus*, Common Centaury. The genus *Centaurium* Hill (1756) is in family Gentianaceae, and should not be confused with *Centaurea* L. (1753), which is in Compositae (Asteraceae), despite their common derivation. Victoria has six introduced species of *Centaurea*, including Malta Thistle, St. Barnaby's Thistle, Star Thistle and three kinds of Knapweed, while our sole native species, *C. australis*, is known as Austral Cornflower.

Centaurium. For derivation see previous entry. The accent falls on the first syllable in Centaury, on the second in *Centaurium*, and on the third in *Centaurea*. In this State we have three introduced species of *Centaurium*, and one native species, *C. spicatum*, Spike Centaury.

Centella. Gk *kenteo*, to prick or pierce (cf. *kentauros*, above), from which also the word centre comes, because a pair of compasses had to pierce a hole in the middle to draw a circle. Our native species, *C. cordifolia*, was once thought to be identical with *C. asiatica*, Indian Pennywort, and was included in Ewart's "Flora of Victoria" as *Hydrocotyle asiatica*. The common name of our species is Centella, or Heartleaf Pennywort.

to be continued

Nature Notes from the Gold Coast

by ALEX. N. BURNS.

February-March

Despite the several cyclonic disturbances and periods of torrential rain (Mt. Tamborine recorded 48 inches for 24 hours), wild life has been very active and plentiful over the last couple of months. The white spiders have been very much in force, and many butterflies and other insects have fallen victims to them. Most noteworthy among the captured butterflies were examples of the Common Jezabel (*Delias nigrina* Fab.), several specimens of the Australian Leafwing (*Doleschallia bisaltide australis* Feld.) which is a very strong flier and a robust insect, and many individuals of the Green Awl Skipper (*Hasora discolor mastusia* Fruhs.). These pretty skippers are active at flowers mainly in the early morning and late afternoon right up until dusk, and they favour particularly, flowers of the Buddleyia in the racemes of which the white spiders love to lurk. These predators act with amazing speed; firstly they spin a series of short threads amongst the individual flowers, the butterfly's legs become impeded in movement which enables the spider to seize the ventral portion of the thorax, mainly between the second and third pair of legs. Almost immediately the butterfly becomes paralyzed and is rendered immobile within seconds; the spider then feeds on its body juices.

Spiders of many kinds have been extremely plentiful both in the garden and on buildings. One species similar in appearance to an Orb Web Spinner (*Araneus* sp.) constructs a very sticky web which is able to hold large creatures even other than insects.

No less than two quite large Skink Lizards (each about 5 inches in length) were rescued from these webs in the last couple of weeks. Another very large species of Orb Web Spinner which constructs huge webs suspended between trees in the garden has accounted for such powerful and rapid moving insects as Hawk Moths. A couple of days ago a large example of the Convolvulus Hawk Moth (*Herse convolvuli* L.) was found in one of these webs. The spider apparently realized that the moth was strong and active and lost no time in completely enveloping it with web to the extent of giving it a cocoon-like appearance. Quite large Dragon flies and cicadas are quite commonly seen trapped in these webs.

With the flooding and consequent overflowing of the Currumbin lagoons the water bird life has become really scarce; so much so that the wild duck population at the big lagoon at the Bird Sanctuary sank to some 40-50 individuals. This however has been offset by the visitation of up to 300 seagulls which took up their abode on the big lagoon. No doubt this visitation was brought about by the extreme roughness of the sea when the cyclones struck at the times of king-tides. The last couple of weeks have given fine and mild weather with fresh nights and occasional night showers. The seagulls still remain and the wild duck population has increased to about 200.

In the Burleigh National Park the hatching of Scrub Turkeys from the nesting mounds has been excellent, and from observations made, I would estimate that at least 75 per cent. of

the young had survived. The floods drove the rock wallabies to the highest and most rocky parts of the park; even now only less than half the usual number are coming to be fed at the usual spots. During the period of heavy and constant rains the Rainbow Lorikeets and other keets greatly increased their numbers at feeding times at the Bird Sanctuary, no doubt on account of the nectar being washed out or greatly diluted from the blossoms of the flowering Paperbarks (*Melaleuca leucadendron*) and Eucalypts. At present, of the latter, the principal flowering ones are Bloodwood (*Eucalyptus corymbosa*) and two species of white barked gums.

Specimens of the White Nymph Butterfly (*Mynes geoffroyi guerini* Wall.) have been very plentiful

throughout the last couple of months. Many specimens have been observed in every month since last June, and close observations made of the feeding trees (*Laportea* sp.) in the rain forest of the National Park have revealed the presence of eggs, larvae (which are gregarious) in several stages, and several lots of pupae in each month since last June. At the present time I have noted with great interest that some quite large trees (up to 15 feet high) are almost now defoliated. I have not seen or heard of this before with this butterfly which is normally regarded as being local and not really common. Other feeding trees near Mt. Warning (N.S.W.) and on the Tweed River are similarly affected at the present time.

* * *

Readers' Nature Notes

A Meal for a Silver Gull or a Tern?

At about the end of last summer, whitebait were plentiful in many parts of Port Phillip Bay. Numerous seabirds were pleased to have this item on their menu and there was sometimes considerable competition for this food.

At Rickett's Point on one occasion, a Crested Tern was seen carrying a rather large whitebait in his beak, when he was pursued with great determination by a Silver Gull. The Tern, who was equally determined to retain the prize, repeatedly swooped, climbed, banked, turned (no pun intended), changed direction, flew back the other way and, in fact, indulged in just about every type of diversionary tactic possible.

The Gull, apparently with a better turn of speed, kept up the pursuit and harassed the Tern in every way that he could devise, except possibly by

actual body contact. Both birds continued to show equal determination with the Gull attacking so strongly that he appeared likely to be the one who would consume the fish. However, after the chase had lasted possibly for about ten minutes the Gull gave up to join a number of his kind who were being fed by a person sitting in a car. This, he must have decided, was an easier way to obtain a meal!

The Tern flew off to join a group of others on the rocks and attempted to feed a well-developed young bird but, as there was still competition for the fish, he flew to a part of the beach where the remainder of the meal was consumed.

The above incident was probably due to the fact that a Silver Gull is not a good diver whereas a Tern dives from the air when fish are near the surface. However, the Gulls do

not always miss out as, on another occasion, one of them was seen carrying a small flounder about three inches long. How this was consumed we were, unfortunately, not able to find out.

A.E.B.

Peanut Worms in the Bay

This note comes from J. C. Le Souëf of Blairgowrie, in Victoria.

With the low tides of summer, and the many hundreds of small children searching the shallows, some knowledge may be gained of the local marine population from specimens brought in for identification to the Rosebud Aquarium and Museum. Each year comes a procession of starfish, sea cucumbers, jellyfish and sea urchins with the occasional swimming anemone. Large numbers of crabs and small fish appear with the occasional rare specimen for the National Museum. Of the larger fish, a surprising number of stargazers are brought in, unrecognised by the normal rod and line fisherman because of their habitat being in the shallower water.

This year for the first time in 14 years, a number of the Peanut Worms (*Physcosome japonica*), one of the many wormlike creatures found along the coastline, were brought in. From 200 mm to 300 mm in length, a thickness of about 15 mm greater increasing towards the anterior end, they were grey in colour and longitudinally ribbed.

Of quite some public concern was the appearance in some numbers of the Blue-ringed Octopus (*Octopus maculosus*). Despite wide publicity at the time several children were seen to pick them up by hand. *Octopus cyaneus* is common along the sand bars while *O. maculosus* has been relatively rare, with perhaps a dozen or so reported each year until the last summer when there were far more than usual.

Fluffy Gliders abroad in Daylight

Tom Sault and Mavis Taylor contributed this most interesting note on the Fluffy Gliders at Wingan Inlet, which were observed during daylight at a M.S.G. (F.N.C.V.) Camp in December, 1973.

The Christmas camp at Wingan Inlet was an enjoyable affair in many ways but perhaps the most memorable event was the daytime sightings of the Fluffy Glider (*Petaurus australis*), generally known along with the other gliding species as a nocturnal mammal. Its distinctive calls were heard often at night, but its presence during daylight hours (up to 1 p.m. D.S.T.) caught members by surprise.

The following is a detailed description of sightings by one of the M.S.G. members:

Wandering around the camp area about 11 p.m. a couple of evenings after arrival at the camp, I heard a heavy plop on to the trunk of a tree a few feet away; I flashed my hand torch in the direction of the sound, and saw what might have been a Brushtail possum (there were several almost tame Brushtails wandering around the camp area looking for food scraps), but it was definitely not. I called one of the other members to bring a spotlight, and as the animal scampered up the trunk from about 12 feet, we could easily see it was a Fluffy Glider — dark stripe down the back of a brownish grey body and a long fluffy dark tail. As it moved around the tree trunk we caught a glimpse of its creamy coloured belly. It was the first time I had seen a Fluffy Glider at such close range, but there were better things to come. A couple of mornings later (27 Dec.) at about 10 a.m., a member of a party camped next to us asked if I could help them identify an animal climbing a tree trunk some 30 yards up the

track leading into the camping area. Unbelievably, it was another glider — in broad daylight. It had just reached the end of one of the top branches. It made a couple of forward movements as though to take off; then swish, a beautiful glide right over our heads to the accompaniment of several “ooh-aahhs” of amazement from the several delighted spectators. The Glider landed on a Bloodwood tree some 150 ft. away, climbed about three-quarters of the way to the top, and started nibbling and licking at the bark. We watched for 15 minutes or so, and as the Glider did not appear to be in a hurry to move off again, we returned to camp for binoculars, chair and mosquito repellent. One of the campers set up his movie camera. We kept watch until 1 p.m. D.S.T. Up until about 12.30 the glider changed position a few times, moving up a little way and around the tree trunk, with the beautiful long tail waving slightly in the breeze. This glider, unlike the one sighted a couple of nights previously, was more brown in colour, with a dark cream belly. At 12.30 he moved out to the end of one of the highest branches, readied himself like a diver about to dive from a spring-board, took off and glided almost over our heads (showing his beautiful creamy belly), to a tree about 50 ft. away. It stayed nibbling for about 10 minutes, then back to the original tree which was well marked from many previous feedings, stayed another 10 minutes, then up to the top branches, and a beautiful glide down towards the gully, out of sight; presumably, home to its nesting hollow. It was then

1 p.m. We had had the glider under observation for three hours in broad daylight. Two days later (29 Dec.), I was about at 6 a.m., and wandered up to the “Glider tree” hopefully. There it was, nibbling away. It made a couple of short glides during the half-hour I watched, then glided off in the same direction as previously.

During the following week a Fluffy Glider was disturbed from a cosy sleep amongst papers in one of the camp rubbish bins. He bounded up the nearest bloodwood tree and started feeding, quite oblivious to the enthusiastic photographers below.

In “Nature Notes” in the *Age* newspaper for 23 May, 1966, the late Norman Wakefield wrote of the association of the Fluffy Glider (*Petaurus australis*) with the Bloodwoods (*E. gummifera*), and again later wrote that the favourite food tree was Apple Box (*E. bridgesiana*). This species is common in East Gippsland, but outside the Wingan Inlet National Park. Other species of eucalyptus food trees listed by Norman Wakefield included *E. st. johnii*, *E. viminalis* and *E. rubida*. It is worthwhile noting that many other species of Eucalypt in the Bloodwood group as well as *E. gummifera* occur along the whole east coast of Australia, and the Fluffy or Yellow-bellied Glider is known to occur from near Cairns, Qld., to Portland, Vic.

It would be interesting to hear from interstate readers who may have made observations of food trees linked with *Petaurus australis* in their respective States.

Corrections

In the article “Eucalypts”, by J. H. Willis (*Vict. Nat.*, Vol. 91, Apr. 1974) :

Page 100, par. 2, line 1 — before ‘excuse’ insert ‘no’.

Page 100, par. 2, line 7 — for ‘land’ read ‘inland’.

Page 100, 3rd last line — for ‘citrol’ read ‘citral’.

Page 101, par. 4, line 1 — for ‘Daniel’ [Nelson] read ‘David’.

Page 101, par. 5, line 2 — for ‘T. T.’ [Labillardière] read ‘J. J.’

The Late Patrick Francis Morris (1896 – 1974)

by J. H. WILLIS

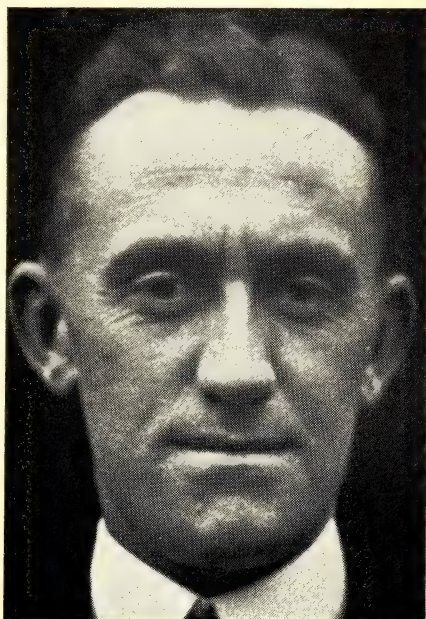
Frank Morris died at Lynn Private Hospital, Armadale, on 11 January last, only five days short of his 78th birthday. The first nine months of his babyhood had overlapped the life of Baron von Mueller, who died on 10 Oct., 1896. At 17 years of age (28 Aug. 1913), young Frank joined the staff of the National Herbarium of Victoria, remaining with this institution for the next 48 years—until retirement on his 65th birthday (16 Jan. 1961). During almost half a century of botanical work in the place where Mueller had laboured for 39 years, something of the spirit and many of the traditions of his great forerunner were naturally absorbed. Early in his professional career he worked under Professor A. J. Ewart (*obit* Aug. 1937) who occupied simultaneously the first botanical chair in Melbourne University and the office of Government Botanist, sharing time between the University and Herbarium. At retirement Frank was the Senior Botanical Officer of Melbourne Herbarium.

Daniel Morris, his father, was a South Yarra veterinarian, who, in common with other local residents, used to graze his milking cows in Fawknor Park. Most probably this early contact with animal health and husbandry served to shape Frank's lifelong interest in grasses, pasture plants and weeds. He never married, but lived for many years with his widowed mother and single sister, Celia, at 6 Mandeville Crescent, Toorak, until they successively died and his own failing health over the past two years made hospitalization a necessity.

In view of Frank's long period of botanical service, he published relatively little; but, with only two or at

most three on the Herbarium staff (and with *no* technical or library assistance whatever) for many years, it is understandable that there would be very little official time for research or writing. Nowadays, much of the advisory service previously expected from and given by officers of the National Herbarium has passed to agrostologists and other specialists in the ever-expanding Department of Agriculture, to the Forest Products Division of C.S.I.R.O. and the various biological research units of our three universities.

It is unfortunate that most present members of the F.N.C.V. know little or nothing of him, for he joined the Club in June 1918, was President in succession to the late P. Crosbie Morrison during a difficult war year (July 1943 - June 1944) and was elected to



P. F. Morris [photo: 1930]

honorary membership in April 1959. He wrote a number of interesting articles and notes for the *Victorian Naturalist*, two of his more important papers being "Grasses of the Melbourne District" (Jan. 1927) and "Native and Introduced *Aizoaceae*", with a colour plate, that appeared in the special jubilee volume, 50, of the journal (Sept. 1933); his last contribution was "Notes on *Xanthium* Species, 'Cockleburrs'" (Sept. 1957) —resulting from researches in British herbaria during his term as Botanical Liaison Officer at the Royal Botanic Gardens, Kew, in 1956.

I worked in close association with Frank for 23 years at Melbourne Herbarium and found him invariably a jovial, outgoing companion, ever prepared to aid other people and to speak his mind in a loud voice — however embarrassing the circumstances may have been! Outside office hours, he was a most enthusiastic member of the Banks Rowing Club, regularly coaching crews on the Yarra River. A large

chiffonier in his home was stacked with cups and trophies he had won at rowing and sculling. His knowledge of Port Phillip Bay, its channels, sandbanks, tides, weather and fish populations was surprisingly extensive and doubtless gleaned from long acquaintance as part-owner of a pleasure yacht.

Latterly he concentrated on bowling, where his expertise in turf culture and green-keeping was widely sought. Always interested in youth welfare work, he would annually collect toys and do them up for distribution to children's homes. Only a month before his death, P. F. Morris made a gift of \$300 to the funds of our Field Naturalists Club. It is fitting that the name of this kindly, extrovert botanist should be perpetuated in those of a handsome downy tussock-grass (*Poa morrisii*) and a delightfully elfish midge-orchid (*Prasophyllum morrisii*) having dark purplish-brown flowers with exceedingly mobile and hairy labella.

Field Naturalists Club of Victoria

General Meeting — 10 June

At the June meeting the speaker was Dr. Brian Smith of the National Museum who gave us a fascinating insight into "The Environmental Study of the Dartmouth Dam". The Museum has had a team working on the invertebrates of the area and Dr. Smith showed slides of the Mitta Mitta River and the inundation area at various seasons, as well as describing the techniques used to collect insects and aquatic life, often working under difficult and unpleasant conditions. He said that this was the first study of its kind that had been done in Victoria, and the information gathered would be valuable in assessing the effects of the dam on downstream rivers.

The Secretary tabled a letter from the Westernport Regional Planning Auth-

ority advising that an appeal had been lodged against the decision to disallow subdivision of Green's "Main Ridge Estate" on Mornington Peninsula. Mr. Riordan said that the Club was entitled to present a further submission when the appeal is heard.

Mr. Dan McInnes spoke about the effects of rising costs on the Club, particularly in regard to the *Victorian Naturalist*, and pointed out that each issue priced at 45 cents was now costing the Club 70 cents. Council had appointed a sub-committee to review the situation and its recommendations would be put into effect as soon as possible.

Miss Ivy Dixon, who has been a member for forty years, was elected to honorary membership in accordance with the by-laws of the Club.

Exhibits at the meeting included a display of greenstone collected near Dookie, Victoria, an exceptionally large specimen of *Cordyceps gunnii*, a vegetable caterpillar; and a specimen of the butterfly *Euploea core corinna*, the Common Australian Crow, collected at Box Hill North but a rare visitor to Melbourne.

A vote of thanks was carried to retiring Vice-President Mr. Leigh Winsor, who is leaving Melbourne to take up a position at the James Cook University in Townsville. Mr. Winsor has been a very active Council Member and also President of the Field Survey Group; although we congratulate him on gaining this position and wish him well in the new surroundings, his energy and enthusiasm will be greatly missed in the Club.

Botany Group — 13 June

A good attendance of members and friends at the June meeting enjoyed Mr. Alex Stirling's talk on the "Wildflowers of the Sydney Sandstones". His collection of slides gave a wonderful overall impression of this colourful area, and the close-ups of many species illustrated the botanical details of flowers and leaves very clearly.

A report was received on the May excursion to the Gembrook-Tonimbuk area. As well as the expected vegetation of the forest and fern gully habitats a large number of fungi were observed, including three species of *Cordyceps*. Unfortunately there is no one in the group at present with a thorough knowledge of fungi, and our records are therefore very inadequate in this field.

The 'flower of the month' was Nardoo; two species were exhibited, *Marsilea drummondii* and *M. angustifolia*. As the genus is well covered in Helen Aston's book, "Aquatic Plants of Australia", no sheet of notes was issued.

The following list of talks and excursions for the next few months may be helpful to members wanting to plan ahead. On Thursday, 11th July, Mr. Rex Filson will speak on "Lichens", and on Saturday, 27th July, he will lead an excursion to look at them in the field. On Thursday, 8th August, Mrs. Ilma Dunn will speak on a slide series, "Looking at Nature — Winter". Mrs. Dunn is a very skilful photographer and this series touches on several areas of natural history, as well as botany. On Sunday, 25th August, Miss Pat Carolan will lead an

excursion to the Macedon Range to study Eucalypts. Miss Carolan has made a special study of gum trees and we expect this trip to interest the beginners as well as the more knowledgeable in the group. On the week-end of 28th-29th September, we are going to the Seymour district; on October 27th there will be a day trip to the Blackwood district and on 23rd-24th November another week-end trip is planned, although the destination has not yet been decided.

Conservation Group F.N.C.V.

The second meeting of this newly-formed group was held on Thursday, 16 May, at 15 Drummond St., Carlton. The group was informed that correspondence and publications on areas of conservation interest at present had been received from the secretary of the F.N.C.V. for their consideration. The problem of ready access to publications on areas of immediate interest that are in the library was brought up, and it was suggested that the librarian be approached on the feasibility of an index of such information being made. Mr. Douglas recommended that the group compile a list of experts in various fields of natural history. It was decided to start first of all by obtaining a list of experts within each group of the F.N.C.V.

The botany group had offered their book of plant records for areas visited since July, 1966, for reference by our group. A list of the areas given in the book has been recorded by the conservation group and the book returned to the Botany Group with thanks for their offer of assistance.

The Land Conservation Council's report on the Melbourne study area was the subject for discussion for most of the evening. Mr. Callanan had prepared a submission on the Dandenong block plus an introductory review of the general reasons for decision on use of crown land which could be applied to all blocks. This was discussed thoroughly by the group.

The number of blocks in the Melbourne study area (24) was more than could be coped with by the small number of members in the group; hence each member present chose one or two for investigation of the L.C.C.'s report and using this, plus their own knowledge of the area, prepared submissions on the blocks for discussion by the group at the next meeting, held on Wednesday, 29 May.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

Key Office-Bearers, 1973-1974.

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Geology: Mr. T. SAULT.

Mammal Survey: Mr. R. J. GIBSON, 7 Cook Street, Abbotsford, 3067.

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96 3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Rates of Subscriptions for 1974.

Ordinary Members	\$7.00
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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 12 August — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

New Members —

Ordinary:

Miss Fiona Bell, 127 Atkinson Street, Oakleigh, 3166 (*Mammal Survey*).
Miss Janine Craig, 88 South Road, Brighton Beach, 3186 (*Mammals, Reptiles*).
Mr. Heinrich Hauf, 48 Finch Street, Burwood, 3125 (*Botany*).
Mr. Robt. C. Anderson, 43A Cookson St., Camberwell, 3124 (*Mammal Survey and Botany*).
Mrs. Ildiko Fuessel, Flat 2, 27 Balmoral Ave., East Brunswick, 3059
(*Marine Biology and Entomology*).

Country:

Mr. A. G. Atchison, 41 Mansfield Road, Euroa, 3666.
Miss M. H. Christie, P.O. Box 488, Swan Hill, 3585.
Mrs. Margaret Doherty, Point Hicks, Cann River, 3889 (*Geology*).
Mr. David Hart, Wyperfeld National Park, c/- P.O. Yaapect, 3424.

Junior:

Katrina Blake, 12 Little John Court, Vermont, 3133.
Michael Schwarz, Devonshire Lane, Mt. Macedon, 3441 (*Native Bees*).

GROUP MEETINGS

Wednesday, 14 August — Day Group. Visit to Planetarium. Meet at 1.45 p.m. at Information Office, Swanston Street entrance.

Wednesday, 21 August — Microscopical Group meeting.

Thursday, 22 August — Conservation Group meeting at 15 Drummond Street, Carlton, 8.00 p.m.

Thursday, 29 August — F.S.G. meeting in Conference Room, National Museum, 8.00 p.m.

Monday, 2 September — Marine Biology and Entomology meeting in Conference Room, National Museum, 8.00 p.m.

Wednesday, 4 September — Geology Group meeting.

Thursday, 5 September — M.S.G. meeting at Arthur Rylah Institute, 123 Brown Street, Heidelberg, 8.00 p.m.

Monday, 9 September — "Naked-eye Astronomy": Dr. M. Beadnell.

F.N.C.V. EXCURSIONS

Sunday, 18 August — Glenburn. This excursion is to the area described in the film "Birth of a Sanctuary", to be shown at the August General Meeting. The coach will leave Batman Avenue at 9.30 a.m. Fare, \$2.50; bring one meal and a snack.

Sunday, 1 September-Sunday, 8 September — Kangaroo Island. Members travelling independently to Adelaide should meet at 8.45 a.m. at Adelaide, where a coach will await the party. Those travelling by train should be at the station in ample time to catch the "Overland" to Adelaide, departing from platform 2 at 8.55 p.m. on Saturday, 31st August. Luggage allowance on plane is one normal sized suit case.

Saturday-Sunday, 19-20 October — Weekend at Bendigo and Maryborough. Saturday will be led by Mr. Frank Robbins who has been uncovering new glacial evidence in the Heathcote-Derrinal area and it is hoped that geologists in the club will turn up in full force. Sunday, members of the Maryborough F.N.C. will lead the excursion which will include a visit to the Cosstick Reserve. Accommodation has been booked at the Oval Motel, Bendigo, for Saturday night on a D.B.B. basis. Cost for weekend, \$21.

December-January — Boxing Day — **2 January** — Falls Creek — details later.

the victorian naturalist

Vol. 91, No. 8

7 August, 1974

Editor:

G. M. Ward

Assistant Editor:

G. F. Douglas

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It is only one month since it was announced in this column that the "Victorian Naturalist", due to tremendous rises in printing costs, would in future contain 24 pages instead of the past 32 pages. It has also been necessary to explore other methods of printing, which while not quite of the appearance of the past method, will be considerably cheaper.

All this involvement in change has given the editor a great deal of extra work, and members and readers are asked to co-operate in understanding if for any inadvertent reason they are inconvenienced by late arrival of their "Naturalist" over the next issues.

It will also be noticed that this issue contains 28 pages — this is because both articles were felt to be of such value, and could not be cut conveniently; together with the fact that they had been previously scheduled for August publication, that it was decided to publish them even though it involved running four pages over the proposed number.

In future, because of the proposed decrease in number of pages, it will, unfortunately, be necessary to curtail Group reports and similar material, leaving the maximum amount of space for articles. We feel that Secretaries and members of these Groups will understand the necessity of this decision.

With the current forecast of inflation rising to a rate of 20 per cent within 12 months, it may be necessary to consider other methods of coping with the probable future increase in printing costs.

Bi-monthly publication?

Perhaps members may have some ideas!

Cover Photo:

Ibis Rookery, Coolart Lagoon.

Photo: J. A. Reid.

Victorian Ornithological Research Group Westernport Report No. 1

Part 1

The Birds of the Somers, Sandy Point, Hastings Districts,
Westernport Bay, Victoria, Australia.

by

WILLIAM A. DAVIS and ALAN J. REID

Introduction

This paper, to be published in parts, is the culmination of the activities of "Survey Somers", a Victorian Ornithological Research Group project carried out by the authors assisted by a number of V.O.R.G. and Bird Observer Club members.

The period of systematic survey extended from 1959 to 1968 and at that time probably represented in man hours the most intensive bird status survey ever attempted in Victoria.

In the light of industrial pressures and the current series of biological studies of the Westernport region, "Survey Somers" would seem to be a valuable background study particularly that section conducted on the Sandy Point Peninsula. Government botanist, J. H. Willis, in a letter of 30/3/1971 to A. J. Reid suggests "that because of its extent and excellent state of preservation the Sandy Point area is a good example of the coastal woodland which has almost disappeared from the Mornington Peninsula or exists only in a damaged state".

Also included in the systematic study and regular census was the historic "Coolart" property. The man-made lagoon represented a highly productive waterfowl habitat and breeding area of proven educational value.

Early Ornithological Records

When one considers the close proximity to Melbourne of the Mornington Peninsula, it is surprising to find little

of significance in the available early literature. Indeed the entire Westernport region received only scant attention until recent times.

Westernport was discovered by George Bass. On entering the bay on 5th January, 1798, he wrote "Black swans flew by in hundreds"¹. This is the first recorded reference to the avifauna of the region. Black swans were also mentioned three years later in 1801 by Captain Grant surveying the bay in the *Lady Nelson*. His crew captured many cygnets.

For the next five decades the bay was frequented mainly by sealers and whalers and seal rocks on Phillip Island provided a rich harvest of skins and oil. There was indiscriminate slaughter of the pups and the seals diminished in alarming numbers. Using the ships' boats the callous sealers chased black swans for food during the moulting season. Mutton birds which also abounded were dragged from their burrows and roasted².

In 1850 Thomas Charles King, Master of the schooner "Red Wings", went into Westernport. He sent the ships' crew to Yalloch Creek. They returned with no less than 32 dozen swan eggs³.

H. W. Wheelwright recorded during the years 1853 to 1859, 190 species of birds between Mordialloc and Westernport. This appears to be the first bird list for the district although it was not published in full. Around

1860 he recorded the Native Companion. He obtained sustenance by shooting fauna to be sold at the Melbourne market. Birds included quail, snipe, native pigeons, waders, herons, egrets, ducks, swans, parrots, etc.⁴.

Foundation R.A.O.U. member, G. E. Shepherd, lived at Somerville for many years. During 1880 around Westernport his observations included King Quail, Painted Quail, Little Crake, Spotless Crake, Red-kneed Dotterel, Eastern Curlew, White Egret, Plumed Egret, Purple-crowned Lorikeet, Yellow-tailed Black Cockatoo, Ground Parrot, Dollar Bird, Rainbow Bird, Brush Cuckoo, White-winged Triller, Southern Emu Wren, Masked Woodswallow, Horsefield Bush Lark. He mentions the Jardine Caterpillar Eater (Cicada Bird) breeding at Oliver's Gully (near Moorooduc) as late as 1890⁵.

His notes on the Eastern Curlew are interesting. He states "Towards the end of November thousands are to be seen at high tide perched on mangrove scrub waiting for the water to recede, at which time they pounce on crabs hooking them out of their holes with their long curved bills"⁶.

Lindsay Clarke in 1880 noted the Satin Bower bird at Bass River. Records of the Great Knot and Reef Heron appeared about 1890⁷.

Another R.A.O.U. foundation member, S. P. Townshead (also a F.N.C.V. member) lived for a period at Mornington. He collected extensively around Westernport during 1901 and 1902. Some noteworthy specimens included Marsh Tern, Golden Plover, Turnstone, Banded Stilt, Gang Gang Cockatoo, Leaden Flycatcher, Hooded Robin, White-winged Triller, Spotted Quail Thrush, Grey-crowned Babbler, Tawny-crowned Honeyeater, Spiny-checked Honeyeater⁸.

There is nothing of importance recorded for a further three decades

until the mid 1930's when Jack Jones (R.A.O.U.) spent a deal of time at Coolart, Bittern and Sandy Point. He prepared a systematic list for the owner of Coolart around 1936. It contained 103 species (76 native species at Coolart, 26 actually noted breeding). Records of considerable interest were Marsh Crake, Brown Bittern, Blue-billed Duck, Hooded Robin, Spotted Quail Thrush, Grey-crowned Babbler, Chestnut-tailed Ground Wren, Olive-backed Oriole⁹.

B.O.C. member, Phillip Brooke, while serving at the naval depot recorded 102 species between 1949 and 1952¹⁰.

W. Roy Wheeler (R.A.O.U.) compiled an early list about 1957 for Alan Reid of the birds of the Mornington Peninsula containing 203 species (the current Peninsula list contains over 270 species)¹¹.

This brings us to 1958 and the commencement of Survey Somers.

Survey Background

Alan Reid was nature study instructor at the children's education camp at Somers from 1959 to 1966. In addition to background ecological notes, he kept a bird list for the district and also carried out bird banding studies on the Red-capped Dotterel and Yellow Robin. Coolart was frequently visited and used as a subject for student nature studies. Alan's original list formed the basis for Survey Somers.

Bill Davis became interested in the area during a family holiday in 1960. On meeting it seemed logical to combine forces and commence a systematic study of the birds of the district. Permission was obtained from the naval authorities to include Hanns Inlet and the Sandy Point Peninsula on a regular visit basis.

Regular fortnightly trips commenced on 18th August 1962 and con-

tinued until August 1966. Since that time trips have continued but not on the systematic base. During 1962 the Victorian Ornithological Research Group (V.O.R.G.) was formed and Survey Somers became a V.O.R.G. project under joint leadership with Bill Davis acting as recorder.

The assistance of other V.O.R.G. and B.O.C. members was gratefully accepted and our thanks are hereby recorded to the following — Frans Fehrer, Fred Smith, Ian May, Murray Boucher, Marc Gottsch, Don Bowry, Don Townshend, Des Quinn, Howard Jarman, Gordon Cameron, Neil Wetherill and Roy Wheeler. Frans Fehrer, Fred Smith and Ian May deserve special mention as they attended over half the total of 93 systematic survey trips.

Survey Methods

Alan Reid lived at Somers during the survey period and, as a consequence, observed birds from Hastings around to Merricks on the coast and inland. His duties at the education camp involved various aspects of outdoor nature study and bushcraft. As a result, opportunities were ever present for bird study. Most areas thus received constant attention especially the Somers, Balnarring and Coolart foreshore scrub, the Tulum Creek and Coolart Lagoon.

The systematic survey involved a regular pattern of visits to carefully selected and varied habitats at specific time slots each fortnight. The survey run commenced along South Beach Road at 8.30 a.m. then proceeded to Sandy Point via Hanns Inlet. The extensive tidal flats and the dunes were then visited. The run concluded at Coolart with a check of the Lagoon and as dusk set in, birds returning to roost were counted.

On every survey trip weather and tidal conditions were recorded, a species list was compiled and an esti-

mate made of the numbers of individuals present. The resulting information was transferred to large master charts.

The following water bird populations were graphed in order to establish regular migratory patterns or changes in population strength: Black Cormorant, Little Pied Cormorant, Crested Tern, Silver Gull, Pacific Gull, Spur-winged Plover, Hooded Dotterel, Double-banded Dotterel, Red-capped Dotterel, Eastern Curlew, Red-necked Stint, White Ibis, Straw-necked Ibis, White-faced Heron, Black Swan, Chestnut-breasted Shelduck, Black Duck, Chestnut Teal, Grey Teal and Hardhead.

Biological studies at Coolart related to the Ibis species and Little Pied Cormorant. Populations and breeding performance were considered in relation to rainfall and lagoon water levels. The size, time and direction of returning flocks to Coolart each evening were noted and graphed. All these factors will be considered in the systematic list under each species.

Habitat Descriptions

The survey area included the natural bushland and swamps of the Sandy Point area, the dunes, mangroves and foreshore scrub along the coast from Hastings to Merricks, the townships of Somers, Balnarring, Balnarring East, Bittern, Hastings, Stony Point and Crib Point, and the surrounding farmlands to a distance of five miles from the coast. These farmland areas included some orchards, scattered remnants of Messmate-Peppermint Woodland and regrowths of non-saline heaths.

1. COASTLINE, COLES BEACH TO SANDY POINT

An unbroken broad sandy beach extends the full length of the coastal system except for the Balnarring rock platform. Tidal energy throughout the

system is generally weak but increases strongly towards Sandy Point. Some alongshore drift of material does occur between Balnarring and Western Park. Vast banks of Leafy Sea Wrack, *Amphibolis antarctica*, and sand form during winter months. Large areas of typical coastal dunes occur west of Sandy Point and east of Balnarring. These contain vigorous growths of the Sea Rocket, *Cakile maritima* and Spinifex, *Spinifex hirsutus*. The survey included observations approximately half a mile out to sea.

2. SALT MARSH, MANGROVES AND TIDAL MUD FLATS

These extend intermittently from Sandy Point northward to Denhams Beach with occasional intrusions of rocky headlands. Large pure stands of the White Mangrove, *Avicennia marina* occur. The dominant vegetation of the salt marshes consists of the Glass Wort, *Salicornia* sp. and Samphire, *Arthrocnemum* sp. Much of the exposed tidal flats zone is covered with the Sea Grass, *Zostera nuelleri*. On the permanently covered flats, it is displaced by *Heterozostera tasmanica*. Hanns Inlet was typical of the salt marsh mangrove association.

3. SANDY POINT

Vegetation Associations. This area of approximately 4 sq. ml. carries a most interesting diversity of vegetation associations. These are as follows:—

- (a) Fresh water swamp. This one acre area of shallow water abuts the Southern side of Hanns Inlet. It featured substantial reed beds of Carbunga and Junkus grass, Malaleuca thickets and grassy fringes. It was a prime habitat for waders, especially during high tide.

- (b) Messmate-Peppermint Woodland which occurs in the vicinity of the Rifle Range and south of it.
- (c) Peppermint Grassy Woodland which occurs south of the above association and extends to the Western Park northern boundary.
- (d) Manna Gum Woodlands — covering an area approximately half a mile wide, extending north-eastward from the north-eastern corner of Western Park. Under these trees Bracken is associated with an assortment of heath plants.
- (e) Paperbark Thickets on inland side of Salt Marsh.
- (f) Wet non-saline Heath — small area between the Peppermint Grassy Woodland and the Manna Gum Woodland.
- (g) Coastal Banksia, *Banksia integrifolia*, occurs in a belt running east to west. This is the finest stand now existing on the Mornington Peninsula and includes trees over 100 years old.
- (h) Coastal Tea Tree, *Leptospermum laevigatum*, occurs in a belt immediately south of the Banksias and extends to the southern coastal beach. Examination of this belt provides interesting evidence of alteration in the southern coastline.

4. FORESHORE SCRUB

For seven miles west from Sandy Point runs an almost unbroken belt of Coastal Banksia with Coastal Tea Tree, *Leucopogon parviflorus* and Coast Acacia, *Acacia longifolia*, flanking it on the seaward side.

An understory of Swordgrass, *Lomandra longifolia* and *Tetragonia* sp. is



Plate 1

i

Habitat 1.

Coles Beach,
Balnarring,
Dec., 1962.

Photo: A. J. Reid.



ii

Habitat 2.

Mangroves and
Tidal Flats,
Sandy Point,
1974.

Photo: W. A. Davis.



iii

Habitat 3(b).

Messmate,
Peppermint
Woodland,
Sandy Point,
1974.

Photo: W. A. Davis.

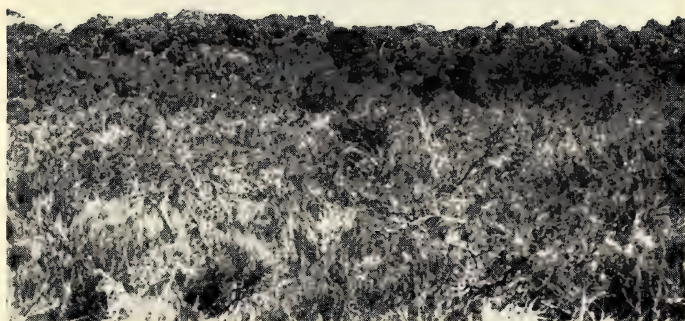
Plate 2

i

Habitat 3(f).

Non-saline
Heathland,
Sandy Point.

Photo: W. A. Davis.



ii

Habitat 3(g).

Banksia Belt,
Sandy Point,
1974.

Photo: W. A. Davis.

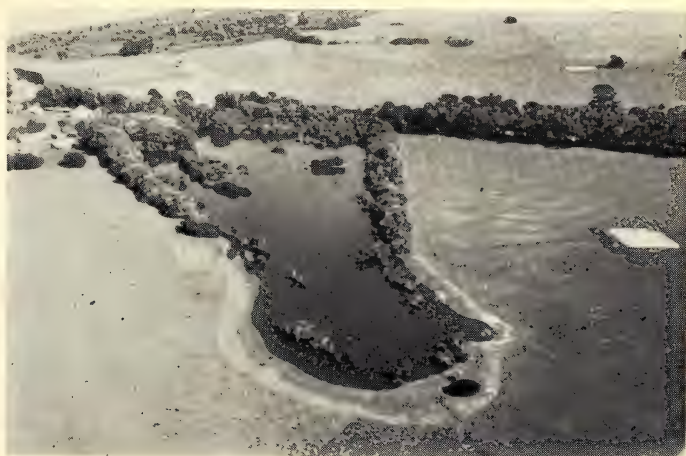


iii

Habitat 5.

Coolart
Lagoon, 1964
(Aerial photo).

Photo: A. J. Reid.



August, 1974

a feature of a large portion of this foreshore scrub.

This pattern is interrupted at Somers by the outflow of the conjoined Tulum and Merricks Creeks which break through the blocking sandbar each winter to become tidal until the following summer.

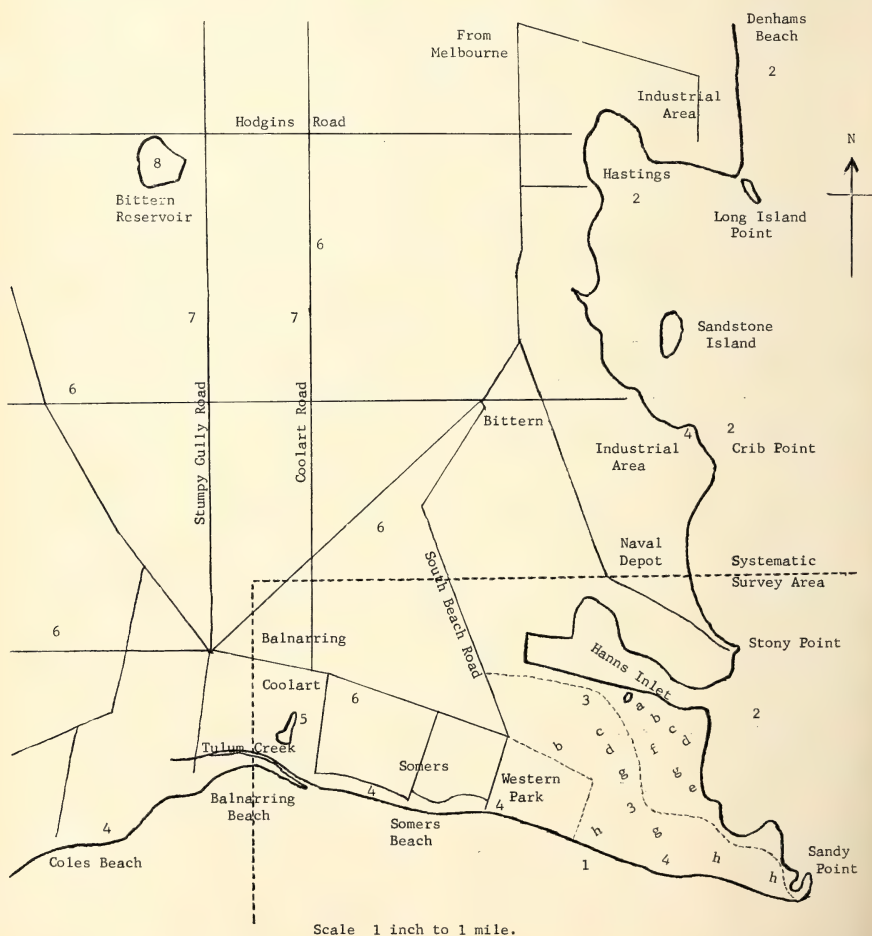
Remnants of this type of foreshore scrub exist intermittently north of Sandy Point especially in the vicinity of Crib Point.

5. COOLART LAGOON

This man-made lagoon of approximately 11 acres is surrounded by introduced Oaks and Willows and a natural swamp regrowth of *Malaleuca* species. Several man-made islets also carry *Malaleuca* thickets. Periodic blooms of *Azolla* water weed coat the surface. Sheep were allowed access to the North Eastern shoreline until 1964. A spillway controls the upper limit of the water level and natural

Figure Number 1

GENERAL SURVEY AREA



drainage from the Northern paddocks provides the bulk of the water. An extensive exotic garden adjoins the historic Coolart homestead just 100 yards from the lagoon. The original drive to the homestead is heavily planted with *Eucalyptus* and *Pinus* species.

6. FARMLANDS

Over the survey period sheep grazing was the major farming pursuit. On the hill slopes to the West there are some orchards and poultry farms. Dams and water holes for stock watering must also have an influence on bird populations. Some small stands of dry sclerophyll forest still remain.

7. ROADSIDE VERGES AND REGROWTH HEATHS

These are particularly evident along Coolart and Stump Gulley Roads and about the Balnarring racecourse. During the early survey period, they were more extensive.

8. BITTERN RESERVOIR

A substantial water storage scrub-lined on two sides but essentially featureless.

9. HUMAN SETTLEMENT AREAS

These include the children's school camp, Lord Somers Camp, Balnarring, Balnarring Beach, Bittern, Stony Point, Crib Point, Hastings and the Naval Depot grounds.

SYSTEMATIC SPECIES LIST

The classification is that of H. T. Condon, "A Handlist of the Birds of South Australia", 1969, published by the South Australian Ornithological Association. For habitats, refer map and habitat descriptions.

1. *Eudyptula minor*, Little Penguin.

Beach-washed specimens found all months of the year. Occasionally an old bird washed up still alive. Heard calling all months around coastline of survey area. Habitat 1 (H1).

2. *Podiceps novaehollandiae*, Little Grebe.

Often seen at Coolart, two to six birds noted most months. Also listed for Hanns Inlet freshwater lagoon. H3 (a), 5.

3. *Podiceps poliocephalus*, Hoary-headed Grebe.

Recorded at Bittern Reservoir. First seen at Coolart during July 1963 and occasional visitor thereafter. H5, 8.

4. *Podiceps cristatus*, Great-crested Grebe.

Permanent resident at Bittern Reservoir. H8.

5. *Diomedea melanophrys*, Black-browed Albatross.

Often observed out to sea during June, July and August. H1.

6. *Diomedea cauta*, White-capped (shy) Albatross.

Beach-washed specimen November 1962. Noted out to sea during June and July. H1.

7. *Macronectes giganteus*, Giant Petrel.

Recorded twice only. A single bird on Somers beach July 1964. Second sighting a month later at Sandy Point. H1.

8. *Daption capense*, Cape Petrel.

On 6th July, 1961, a Cape Petrel was identified flying past old pier at Somers. H1.

9. *Halobaena caerulea*, Blue Petrel.

Beach-washed specimen collected on 1st August, 1973, by Neil Wetherill was the eighth Victorian record.

10. *Pachyptila turtur*, Fairy Prion.

Beach-washed specimens collected August 1961, August and September 1962, and again during February 1965 and August 1966. H1.

11. *Pachyptila desolata*, Dove Prion.

Single beach-washed specimen collected August 1966. H1.

12. *Pachyptila salvini*, Medium-billed Prion.

Beach-washed specimens August 1966 and 3rd July 1969. H1.

13. *Puffinus carneipes*, Fleshy-footed Shearwater.

Beach-washed specimen collected by A. J. Reid on 11th May 1963 was fifth Victorian record. H1.

14. *Puffinus griseus*, Sooty Shearwater.

Beach-washed specimen collected on 21st February, 1965. H1.

15. *Puffinus tenuirostris*, Mutton Bird (short-tailed Shearwater).

Often collected as beach-washed specimens along survey beaches September to May each year. Sightings at Sandy Point February and March — up to 200 birds seen. H1, 2.

16. *Pelicanoides urinatrix*, Diving Petrel.

During June 1961 many beach-washed specimens found. Further specimen collected on 28th February 1969. H1.

17. *Pelicanus conspicillatus*, Australian Pelican.

Consistently recorded in varying numbers all months of the year from Naval Base mud flats. Largest count 20 birds during September 1962. H2.

18. *Sula bassana serrator*, Australian Gannet.

Often observed out to sea during winter months. Single records for November and December 1962. Beach-washed immature specimen collected on 26th May 1967. H1, 2.



Plate 3

*Eudyptula
minor*,

Little Penguin,
Phillip Island,
1973.

Photo: W. A. Davis.

19. *Phalacrocorax carbo*, Black Cormorant.

Common resident species noted from Naval Base mud flats, Somers seashore and Coolart lagoon. Recorded nesting at Coolart November 1962 and again in December 1963. Peak populations at Coolart during October, November and December each year. Counts during these months averaged eighteen birds. H1, 2, 5.

20. *Phalacrocorax sulcirostris*, Little Black Cormorant.

Recorded during all months from beach locations and Coolart. Numbers never exceeded six birds per survey trip. H1,2, 5.

21. *Phalacrocorax fuscescens*, Black-faced Cormorant.

Consistently recorded along the Somers seashore especially on old pier all months of the year. Usually two to six birds. H1, 2.

22. *Phalacrocorax varius*, Pied Cormorant.

Occasional records only. An influx at Coolart December to March 1962/1963 when up to 20 birds were resident. Records of single birds from beach locations most months. H1, 2, 5.

23. *Phalacrocorax melanoleucos*, Little Pied Cormorant.

Present in large numbers throughout beach locations, also at Coolart and most dams within general survey area. Roosting counts at Coolart indicated a resident population of from 100 to 300 birds. Breeding commenced September each year and continued to early January depending on lagoon water level. Breeding activity showed a steady increase from six nests in 1962 to over 150 nests in 1966.

During the 1967 season the breeding cycle was filmed for "The Coolart Story". After hatching the young retained the all black plumage until approximately eight weeks old when white breast feathers appeared. The young left the nest area approximately twelve weeks after hatching. The birds often use old ibis nests, but generally they preferred higher nest sites. H1, 2, 5, 6, 8.

It is interesting to note that on numerous occasions all five Cormorant species were observed on the old Somers pier.

24. *Anhinga anhinga novaehollandiae*, Australian Darter.

Single bird noted along Tulum Creek during 1961. H4.

25. *Ardea novaehollandiae*, White-faced Heron.

The most common representative of the family ARDEIDAE (Heron, Egrets, Bitterns) throughout the general survey area. At Coolart from two to six birds always present. During June 1964 an influx of over 30 birds spent several months around the lagoon. A pair nested along the Coolart drive during September 1962. Systematic counts along Hanns Inlet and the adjoining mud flats revealed a definite pattern. Population peaks of up to 100 birds, often in flocks, were noted from January to June each year. Dispersal for breeding from July to December was indicated by a fall in numbers to less than ten birds. At this time these were always recorded singly. The species was also observed nesting in pine trees along Hanns Inlet. H1,2, 3, 4, 5, 6.

26. *Ardea pacifica*, Pacific (white-necked) Heron.

Rare visitor to survey area. First listed during February 1965, a lone bird along Hanns Inlet. During June 1965 two birds were seen on several occasions along Tulum Creek.

27. *Egretta garzetta*, Little Egret.

Two records for the district. At Coolart on 28th June 1964, a lone bird was identified. During June 1965 a single bird was noted on several occasions along Tulum Creek. H4, 5.

28. *Egretta intermedia*, Plumed Egret.

The occurrence of this rare Egret around the mud flats of Westernport has already been mentioned under early records. On 5th January 1963, a single medium sized Egret was noted feeding along Hanns Inlet. The bird was still in partial breeding plumage. A close approach was effected and through binoculars, it was apparent the species was not a Little Egret as first thought. The bill was distinctly reddish and the legs carried a strong reddish tinge above the knees. The bird still carried rather ragged plumes on the back and breast. In view of these diagnostic features the Egret was identified as the Plumed. Almost a year later to the day in the same location a lone Egret was noted, this time in eclipse plumage. The bird appeared like a miniature White Egret with a noticeably stout bill. It is probable that this bird was also a Plumed Egret. H2.

29. *Egretta alba*, White Egret.

Consistent records of from 1 to 5 birds along Hanns Inlet and the mud flats all months of the year through the systematic survey period. The species was first recorded at Coolart during July 1963 when a single bird took up residence for several months. During March 1964 three birds were listed and later in June 1965 six birds were seen. Single birds occasionally noted feeding along Tulum Creek. H2, 4, 5.

30. *Nycticorax caledonicus*, Nankeen Night Heron.

Often noted by naval personnel in the pines along Hanns Inlet. Only two occurrences at Coolart. A single mature bird during December 1963 and an immature during March 1965. A further bird was seen along Tulum Creek on 4th February 1969. The species breeds extensively in pine trees on a property near the industrial area at Denhams-Beach. H2, 4, 5.

31. *Botaurus poiciloptilus*, Brown Bittern.

In spite of extensive suitable habitat throughout the survey area, the only records came from the Tulum Creek area. These were interesting in that a single bird was noted during June of 1964, 1965 and again in 1966. H4.

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Geology of Royal Park

by G. B. PRITCHARD

Editor's Introduction

by Thomas A. Darragh*

Those of you interested in the geology of areas in and around Melbourne have probably read *The Geology of Melbourne*, an exceptionally readable little book, written by Dr. George B. Pritchard and published in 1910. G. B. Pritchard was a well known Victorian geologist and lectured in geology at the Working Men's College, now the Royal Melbourne Institute of Technology, from 1892-1934. He was a member of the Field Naturalists' Club of Victoria from 1902, contributing 14 articles to *The Victorian Naturalist*. An outline of his career is given in an obituary published in January 1957 (*Victorian Naturalist* 73: 142-143) and a bibliography of his published writings was compiled by F. S. Colliver in 1947 (*Victorian Naturalist* 64: 33-36).

In February 1959 the National Museum of Victoria received a collection of his correspondence and papers and amongst these was an almost completed manuscript of a small book entitled *Old Port Phillip History as told by the geology of Royal Park*.

Evidently it was a sequel to *The Geology of Melbourne* and *Old Yarra History* (1944). From internal evidence and associated papers it appears that it was written about 1947, when he was in his seventy-eighth year, however much of the information for it and some of the photographs were gathered by Pritchard in the period between 1890 and 1910. Some of the information therein is not available in any published work because many localities he examined are no longer available to us due to housing develop-

ments and land reclamation. As there is not a great deal of literature on the localities he describes available to the interested amateur, and because of the importance of the information in the manuscript, it was felt that it might be appropriate to publish the chapters of his book which still have value at the present time. Particularly as his style of writing and approach to the subject are such that his text can be easily followed by any interested person without a geological background.

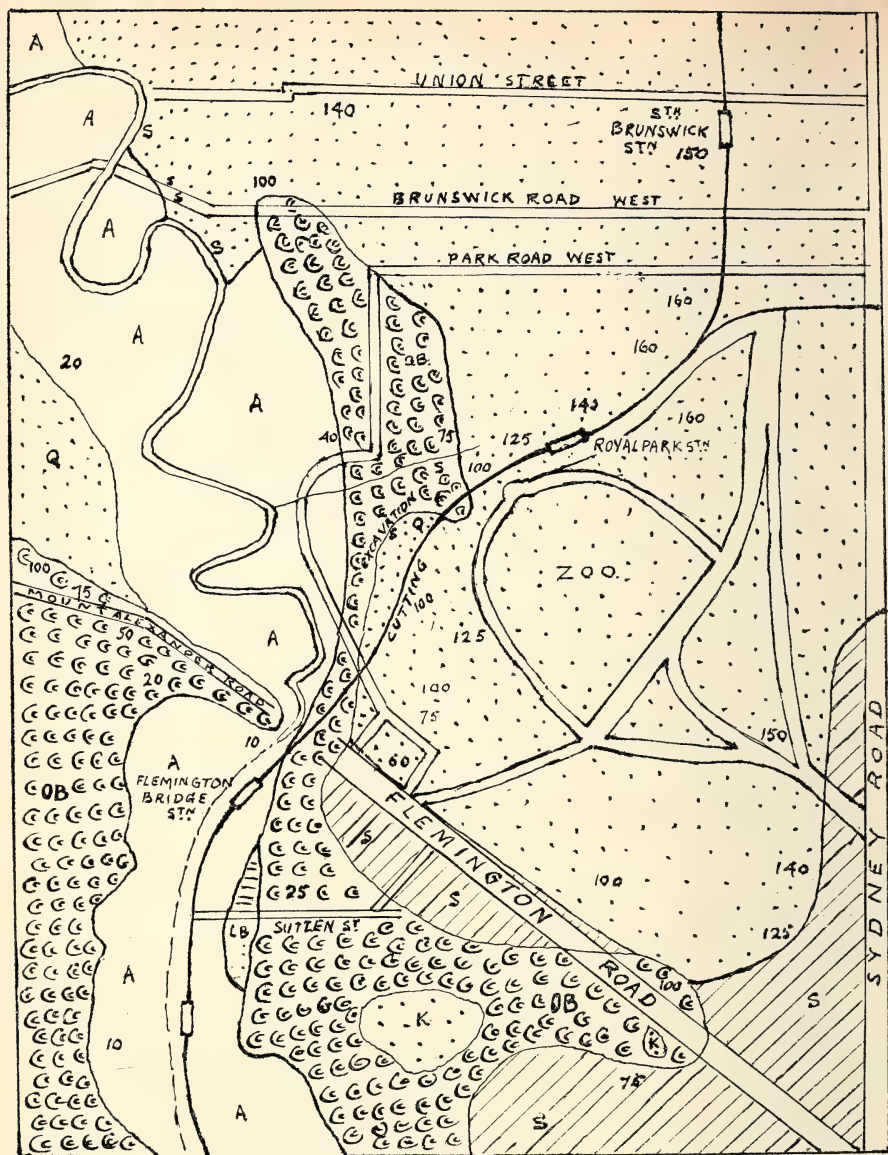
In order to ensure that the text is clear, minor corrections have been made in his geological and stratigraphical terminology, but these are few and the work is substantially as he wrote it.

* * *

HISTORICAL BACKGROUND

The original area of Royal Park was 692 acres; it extended from Mount Alexander Road over to Sydney Road. The Sydney Road frontage was early cut off and subdivided for residential purposes to satisfy some early speculators. An area of 55 acres was enclosed as the Zoological Gardens. A further area of 140 acres was taken up by an experimental farm. The Railway running through the Park took off another 24 acres, and later the Electric Tramways absorbed seven acres. So the original parklands have been whittled away for some time. The most recent alienation has been the entire occupation of the area by troops to the exclusion of the general

*National Museum of Victoria.



[A] ALLUVIUM

[K] KALIMNAN

[CC] OLDER
BASALT

[LB] LEAF BEDS

[S] SILURIAN

Q QUARRIES IN FERRUGINOUS SANDSTONES

10 - FIGURES MARK HEIGHTS ABOVE SEALEVEL

Fig. 1 — Geological Map of the Royal Park Area.

public, followed by the use of military buildings for the temporary housing of certain civilians. (Now removed, Ed.)

Based on the strongest recommendation by Robert Hoddle, Governor Latrobe reserved from sale a belt of land around the original city which included Royal Park and Princes Park in addition to the Flagstaff Gardens, the Carlton and Fitzroy Gardens, the Yarra and Fawkner Parks and the Botanic Gardens. The public is awakening to the value of these breathing spaces and a recent move has been taken to acquire a further 50 acres in the Royal Park area from Brunswick Road downstream to within a quarter of a mile of Flemington Bridge.

Fossils were found in this area in the early fifties in the Tertiary Rocks on both sides of the Moonee Valley, but it was not until the Railway cutting was made through the Royal Park in 1882 that the fact became generally known and collectors soon began to multiply.

One of the earliest building stones of Melbourne was quarried in Royal Park as well as from the valley face on the opposite side of Moonee Ponds Creek on the property of Mr Glass, and to the south of Madden's old home on Mount Alexander Road. The stone was a dark brown ferruginous sandstone and was a strong durable type. Our early architects and civilians were not very favourably impressed with it judging by some of the remarks printed in some of our early records. Its earliest use for jails and churches seemed to strike an unpopular note with the civilians of that period.

Iron ore was another early record from this locality, but although quite a good collection of iron minerals from a student's viewpoint can still be gathered including hematite, limonite,

turqite, goethite, it is absurd in the extreme to think for a moment that any commercial use could be made of these from the iron point of view. An early analysis of a brown hematite, otherwise limonite, is recorded from Moonee Ponds as containing 50-68 per cent iron. Such an analysis would seem to point to an ore of some value and here a point might be made out about the difference between a mineral record and a record of workable quantities of an ore.

Royal Park overlooks Moonee Valley and the origin of this name as well as Moonee Ponds may be worth a few thoughts. If you take the trouble to examine some of Mr. Hoddle's earliest maps of this area you will find that J. Mooney owned property adjoining this valley not very far from the present Moonee Valley Racecourse, and I was always familiar with the fact that this valley was called and locally known as Mooney's chain of Ponds, a very apt description of the ordinary condition of this creek. In several works already published about place names in Victoria, this origin appears to have been unknown, and a very trivial one given in its place.

GEOLOGY

This locality may be reached by the Essendon electric tram from Elizabeth Street to Flemington Bridge, or by train from Flinders Street to Flemington Bridge railway station. Proceed easterly towards the Royal Park and the cutting and other excavations and infillings will be reached in a few hundred yards.

I have memories of an old almost effaced quarry on the northern slope from the present Royal Park railway cutting overlooking the Moonee Valley which could have been in the closer-grained ferruginous sandstones of the upper beds of this area.

Mr. J. G. Knight, one of Melbourne's early architects, in 1859, stated, "Several buildings were raised with a sandstone principally obtained from a quarry on the Saltwater River, near the Melbourne Racecourse". St. James' Cathedral originally on the block of land between Collins Street and Little Collins Street adjoining William Street, had its foundation stone laid on the 9th November, 1839. "The whole building was ultimately of the ugly brown stone" was the description given by a later author. The Racecourse in 1839 was on the flat between Batman's Hill and the present position of the North Melbourne Railway Station, and was approximately parallel to the Saltwater River and no great distance from it, for there was only the Swamp intervening. I have no doubt that this old quarry supplied the stone of which St. James' Cathedral was built; it may also have supplied some, if not all the stone for the Melbourne gaol in Russell Street in 1840, which building commenced in 1841, though it was described as not opening for business until 1st January, 1845. There can be no question about the durability of this stone,

although opinions may vary about its colour and architectural effect, its resistance to weathering can still be studied in situ, and the facts that the old cathedral has been pulled down and re-erected elsewhere, and some of the gaol wall blocks have been transported to St. Kilda foreshore to fight against marine erosion, surely speak volumes about a good building stone. Other quarries in this stone were near Glass's place and on the other side of the Mount Alexander Road, south of Madden's old home.

It is the railway cutting through the crest of the valley slope that has opened up much of our more ancient history, therefore I would like in this place to record the following particulars about the railway work:—

- 1882 Single line — Melbourne to Coburg.
- 1885-86 Melbourne to Clifton Hill. Opened 8th May, 1888.
- 1887-88 March 1887 to December 1888. Line duplicated. Excavated material used to build up the gravitation yards between Spencer St. and North Melbourne.



Plate 1

Royal Park
Railway
Cutting from
West end,
shortly after
widening.

Plate 2

Royal Park
Railway Cutting
from East end,
about 1900,
shortly after
widening.



This railway cutting through the Royal Park, a little to the east of Flemington Bridge, is, perhaps, one of the best known and most frequented localities by collectors and school and University classes in Melbourne. This, no doubt, is primarily on account of the ease with which many interesting fossils may be gathered from certain of the beds. Nearly every beginner in geology makes a collection of these Royal Park fossils, as they are of such a type as will readily appeal to anyone at the outset of his studies in this subject. The fossils obtainable here, however, have to be studied and pieced together with the utmost caution, for their usual form is but that of the hardened mud which filled the interiors of various animal remains, or an impression of the exterior markings or sculpture of these remains. The important part of the fossil to the popular imagination is the hardened mud or fine sand which filled the interior of these shells and other organic remains; but, in reality, that which is usually of most value to the expert is the impression of the external characters, though it is often necessary to have internal characters as well.

Collectors of fossils at this locality should, therefore bear in mind, the

importance of taking every care to preserve the external sculpturing of the various remains found, as well as the more easily collected casts. Casts, at the best, may be regarded as somewhat unsatisfactory; but, when they are the only remains available, full collections may usually be made to yield a fair amount of the episodes of the past, and they must on no account be entirely overlooked or ignored, for in careful hands their story is a true one, and should receive the attention which is its due. The mere collecting of fossils at this locality may not seem to be of much use, but careless and indiscriminate collecting will at this section, be attended by many misleading conclusions, and if carried to extremes may even be regarded as throwing some doubt on the practical utility of fossils. Therefore each collector should be warned to keep a proper record of the particular bed or level in the cutting from which his specimens were obtained. Under these circumstances every collection is of the highest value, and may add considerably to our knowledge of the life forms which once existed in this region. This cutting, then, apparently so simple, contains a number of complex and rather difficult problems, and if the whole of

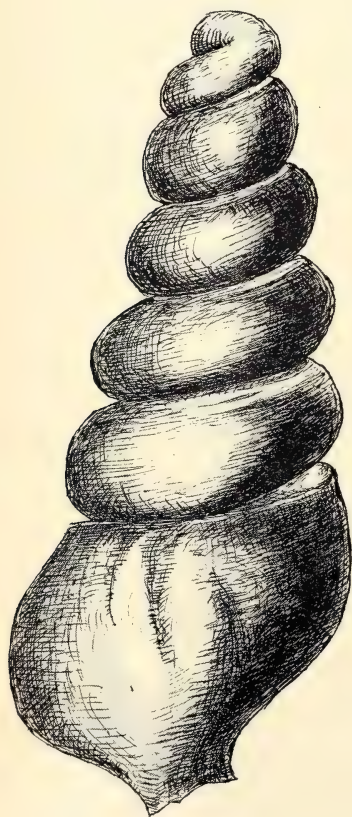
the facts available are not taken in conjunction with one another, very misleading views may be adopted.

There is evidence in this cutting of at least four sets of conditions: *First*, a very small outcrop of the bed-rock or oldest rock of the Melbourne district, which outcropped at the south-western end at about the level of the rails at one time, but is now masked by material which has washed down from above. This was a stratified series of mudstones and shales which were not known to be fossiliferous at this outcrop. If we pass for a moment to the northern slope of the valley side falling away from the cutting and overlooking

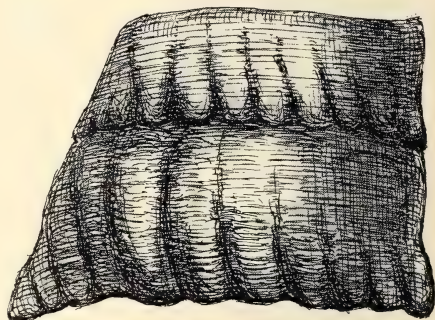
the Moonee Valley, recent excavations started in 1937, will be found that will well repay examination.

The work on this slope was carried out to supply material for filling up and levelling off a new playing field for this area, but the recent war prevented the completion of the job. Here a fine face of the Silurian sediment is exposed some 25 feet in height by some chains in length with a dip of from 17 to 25 degrees (now wholly covered by a stone wall — Ed.).

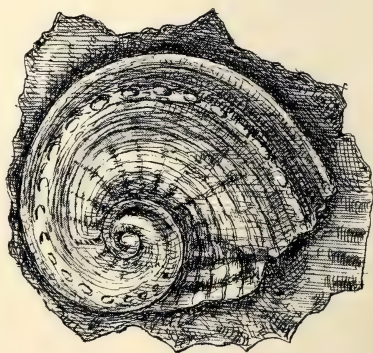
These sediments have already yielded more than one species of *Monograptus*, crinoids probably fragments of *Helicocrinus*, *Lingulella* and



1



2



3

other Brachiopods, *Keilorites* and other worm burrows and tracks. Digressing a little further over to the north in the Moonee Valley on the other side of Ormond Road, the mudstone and sandstones are very rich in fossil remains. These remains enable us to fix the age as Upper Silurian, or as this series is typically developed in the Melbourne area, the term Melbournian is applied to it as a sub-divisional name for a portion of Silurian time as developed in this part of the world. Again, these remains give conclusive evidence of a marine origin for these rocks.

Another important point that has been exposed by this new cut is a patch of leaf-bed clay with ironstone concretions overlying the decomposed remnants of the older Basalt. This was formerly masked entirely by hill slip rubble and soil. It can be seen here to contain plant remains. An excep-

tionally valuable piece of evidence has also been found here in the top-most layer of the ironstone concretionary bed in the presence of marine shell impressions, perfect and fragmentary of a species of *Nuculana*. On careful examination the *Nuculana* proves to be *N. acinaciformis* Tate and associated with it is the gastropod *Leiopyrga quadricingulata* Tate. This would indicate a Kalimnan age for the ironstone beds and is discussed below in more detail. The old Silurian rocks, after they had been raised above sea-level must have been subjected to the various actions of many denuding agents through vast periods of time, for we find the surface of the rocks levelled off, cut into, and hollowed out, over considerable areas. Into some of the deepest of these hollows lake conditions developed which permitted of the accumulation of gravels, grits, sands, clays and vegetable mat-

Plate 3 Some characteristic Royal Park Fossils—

1. *Cerithium flemingtonense*
McCoy (Internal mould).
2. *Cerithium flemingtonense*
(enlarged external sculpture)
3. *Haliotis naerosoides*
McCoy (Internal mould).



Plate 4

Excavations (1937) on north side of Railway Cutting.



ter. Leaf impressions can be found in the finer sands and clays. As subsequent developments in these beds, ferruginous concretions, as well as siliceous concretions in the form of flint or chert can be found. These leaf-beds, from an examination of their plant remains and stratigraphical position, would appear to be of very early Tertiary or Cainozoic age. The equivalent of these beds instead of only carrying plant impressions, in some places carry beds of lignite and even considerable and valuable thicknesses of brown coal. This lacustrine or old lake series is missing from the section as exposed in the Royal Park, but up a small gully that runs past the Zoo and Mount Royal, and at the west end of Sutton Street, North Melbourne, outcrops can now be examined, and leaf-bed evidence collected. South from Royal Park and running from St. Kilda to Williamstown, Altona Bay and Werribee, may be seen the other aspect of this series in an important Brown Coal deposit yet to be fully exploited. So here is one little leaf of past history that can be reasonably intercalated with the particulars of Royal Park Cutting.

The *second* set of conditions to which attention may be drawn is in the interpretation of the several humps of a clay-like material to be seen at intervals along the banks of the section. It does not require a very detailed examination to show that this material is the result of the very complete decomposition of some rock. The isolation of the various knobs shows that its old surface has undergone a great amount of erosion, and at the west end of the section the original character of this rock can still be made out. It was, in fact, once a basalt, and every stage in its decomposition, from the hard, compact undecomposed cores, through the suc-

cessive layers of the spheroidal weathering, to the completely altered rock, is still here; but in the northern side of the cutting much better examples of this rock in its undecomposed state can be collected, and though at first it may seem hard to believe that such a rock could be capable of such marked changes, the successive stages are so easy to follow that no one can have any reasonable doubt about the matter.

These basaltic rocks vary quite a lot in texture, and though usually holocrystalline the minerals are so fine as not to be detected by the unaided eye. The characteristic minerals present are a strongly basic felspar, that is, one rich in lime and ferromagnesian silicates such as augite and olivine, but the latter varies quite a lot in amount sometimes being rather scarce while at others it is quite abundant.

BASALT COMPOSITION

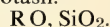
Plagioclase Felspar

1. Oligoclase — Silicate of Alumina, Lime and Soda.



Ferro-Magnesian Mineral

2. Augite — Lime, Magnesia, Iron, Silicate often with Alumina, Soda or Potash.



3. Olivine — Magnesia, Iron, Silicate. $2(\text{MgO}, \text{FeO}), \text{SiO}_2.$

4. Magnetite — Oxide of Iron. Fe_3O_4

Or some form of Titaniferous Oxide of Iron such as Ilmenite.

The chief mineral in this rock being a soda-lime felspar, the soda and the lime is the weak part and it will be attacked by natural waters carrying carbon dioxide. This acid attack will form sodium carbonate and calcium carbonate which may be carried away in solution. Then hydration plays its part on the silicate of alumina, adding water to it and corroding it into clay; but under some conditions the alumina

and the silica are hydrated separately giving rise to bauxites on the one hand, and opaline minerals such as hyalite, opal and opal jasper on the other.

Then the chemical breakdown of the ferromagnesian mineral is just as important, and as this usually is augite, a more or less complicated silicate which may be expressed by the general formula — RO, SiO_2 , where R is the lime, magnesia and iron, or it may take the general formula, RO, R_2O_3, SiO_2 where there is alumina in addition. Here one of the most noticeable points is the hydration and oxidation of the iron making limonite or some allied form, and this stains or discolours the rock, concentrates along the natural cracks, and on the outside of the surface blocks or boulders. To this burnt appearance the popular imagination immediately applies the idea of an original molten mass but the view and reasoning are bad, as it is really evidence of the chemical breakdown of a mineral. The lime and magnesia are converted to carbonate, sometimes to exist separately as calcite and magnesite, sometimes together as dolomite; and again the residue may become clay or different hydrates.

The olivine is likewise due to lose its iron as oxide or hydrated oxide or possibly even to some extent carbonate, which the silicate of magnesia becomes hydrated and is often responsible for the greasy feel to be noticed in decomposed basaltic remains. The magnetic oxide of iron, especially if titaniferous remains unchanged, and may give rise to black iron sands so common in the wash from basaltic country, but under some conditions the magnetite may convert to hematite and give rise to red ochre deposits when associated with clay.

Thus the rock may be entirely changed and numerous new minerals

formed some of which are carried away in solution to be deposited elsewhere later and some of which remain behind in the position of the rock.

The products of decomposition most frequently noticed will be—clays limonite, hematite, bauxite, impure limestone or travertine, magnesian limestone and when the iron oxides become rather more concentrated, laterite. Then the drainage from the decomposed parts may precipitate in suitable cavities in the decomposed rock such minerals as — calcite, ferrocalcite, arragonite, magnesite, or some of the group of minerals known as zeolites, including such as—chabazite, phacolite, phillipsite, mesolite, analcite, and others. The sediment derived from a basaltic area is clayey, so that only argillaceous rocks would be derived in this case. The soils of basaltic areas are well known clay soils, notably disagreeable when wet, very tenacious and retentive of moisture, and liable to become water-logged.

These soils are often referred to as Volcanic soils and are much sought after from the agricultural point of view on account of their richness. They may be red or chocolate from oxide of iron colouring, they may be black from vegetable or other organic matter, or they may be grey in colour. They evidently still contain some soluble mineral matter, as well as other conditions suitable for the sustenance of plant life.

Note the rich potato and onion soils of Port Arlington and Bellarine which have been derived from the decomposition of the "Older Basalt" of those localities.

The age of this old Tertiary lava flow must be very great indeed for on its weathered and worn surface it has a marine deposit of Balcombian Age (Middle Miocene). Underlying it

there are very old Tertiary leaf beds as well as older marine Tertiary sediments. The thickness of this old basalt in this section is now only very trifling and very variable, but as it is undoubtedly a part of the same old lava flow which extends up to Broadmeadows and forms the core of the Kensington and Newmarket ridge to the west and extends to Keilor and forms the North Melbourne hill the high land of West Melbourne and South Melbourne, it is obviously only a small remnant of a very considerable lava flow. This is known as the "Older Basalt" in Victoria, and as to the period of its outpouring the sections under consideration help to some extent to fix its antiquity. The immediately overlying Balcombian sediment contain angular and sub-angular fragments of decomposed "Older Basalt". Thus we reach the *third* set of conditions in this section representing the thin edge of a marine series. Resting in the hollows of the eroded surface of this old lava flow there are deposits of coarse grit and sand and clay, with the top bed of a foot or so in thickness of sandy and gritty material, cemented with oxide of iron usually of a red ochreous character. These upper cemented layers are apparently inseparable from the white beds immediately underlying as the surface of contact is very irregular; the binding iron oxide penetrating to different depths, is apparently due to the rather more porous character of the upper sands, and when the lower clays or sandy clays were reached, free percolation of the iron solutions would be checked or entirely stopped. This appears to be the most feasible explanation for the striking difference and irregularity seen. As everyone knows, who has collected fossils at this locality, it is from this red ochre seam that the best fossils may be

obtained, and the staining of hands and clothes of those who have been at all energetic in working in these beds is quite a familiar feature.

On one occasion whilst collecting fossils from the lowest ferruginous band I picked up a specimen of a bivalve shell, known under the name of *Dosinia johnstoni*, which had evidently been washed down from some of the overlying beds, as judged by the character of the matrix with which it was associated. The whole of the calcareous matter of the shell had been washed out, and a complete pseudomorph of limonite had taken its place. Now, this shell is elsewhere a characteristic late Miocene to Pliocene species and its discovery gave the first hint of the possibility of the existence of two sets of beds amongst these sediments. Following up this clue it was found that the characteristic Middle Miocene or Balcombian fossils were confined to the lowest bed of a foot or so in thickness. Above this level, though fossils are much scarcer, only Upper Miocene-Pliocene forms are obtainable. The material of which these upper beds consists varies from a coarse quartz gravel to very fine sand, with a large proportion of clay. The lowest layers of this series are usually well cemented by limonite, but towards the top of the section this ferruginous cement occurs in a very patchy, irregular, and concretionary form. In many places near the top there is the appearance, as if the ferruginous cement had been removed, but it is often found that the patches deficient in iron oxide are distinctly composed of clay, and it is well known that when clay becomes wet it acts as a very efficient check to free percolation, and, consequently, it would seem reasonable to say that these upper patches, which are now devoid of ferruginous cement, were always in that

condition, rather than that it should have been subsequently removed from such a type of material.

Thus the *fourth* set of conditions presents itself. Fossils are comparatively scarce in these upper beds, and no doubt many have been entirely removed owing to the highly porous character of the sediments. It is only in the finer bands, and patches of limonitic sandstone, that there is a reasonable hope of finding these all-important remains, and when a series of these is once obtained, it requires little more than a glance to satisfy anyone that there is evidence of the existence of two distinct faunas in this section. The impressions of fossil leaves and fruits are also recorded from this locality, and this, taken in conjunction with the coarseness of the sediments and the character of the marine shells associated with them, is very clear evidence of the littoral or shore-line character of these deposits. In the first place, then, fossils pointed to the necessity for discrimination between these beds; in the second place, the lithological characters, the nature and arrangement of the sediments and the Hematitic cement, marks off in a

distinctive manner, the highly fossiliferous band of the lower beds from the more limonitic beds above; and thirdly, there is the stratigraphical evidence of an unconformity, in the form of an overlap, for the lower beds with their characteristic fossils do not rise over the bosses of decomposed volcanic rock, but lie in its eroded hollows, while the upper series have not only completed the infilling of these hollows, but completely overlap the older series, contacting the "Older Basalt" as well as the Silurian, and thus cover a much more extended superficial area in the Melbourne district than the Balcombian deposits.

The Railway cutting measures twenty-one chains in length, and in this distance there is a very heavy rise to the east, as may be gauged by the difficulties of heavily laden trains which have to negotiate this part of the track. The cutting is made on the curve, and the southern face is cut back on a considerable slope, so every care must be taken in the determination of the true thickness of the beds exposed, for, as the section is exposed, each bed appears to be of a slightly greater thickness than its true thick-

Plate 5

Characteristic weathering of Tertiary rocks, Royal Park Railway Cutting, east end.



ness. If you turn to the northern side of the cutting there will be a better opportunity of examining the geological section, for here the side cutting is practically vertical, and as we are dealing mainly with horizontal, or nearly horizontal beds, there is no exaggeration of thicknesses, nor obscurity of relationships.

In this section the lithological dif-

ferences between the lower beds (Balcombian) and the Upper beds (Kalimnan) are well marked, but the hematitic band is more extensive, as it ranges along almost the whole length of the cutting and drops down to rail level to the east owing to the steep grade of the floor. This bed is very full of fossils and will always well repay anyone who may care to in-

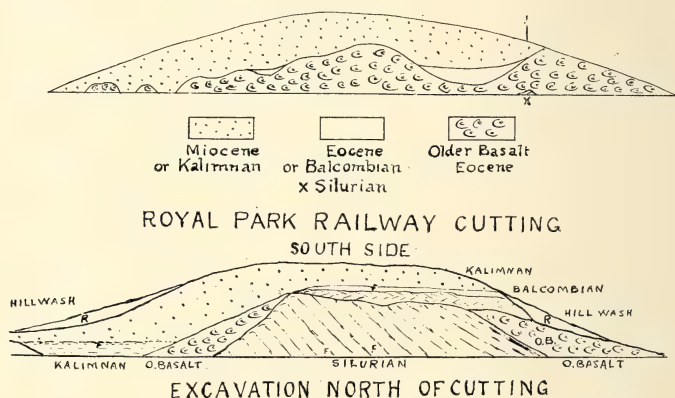


Fig. 2 — Sections shown in Royal Park Railway Cutting.

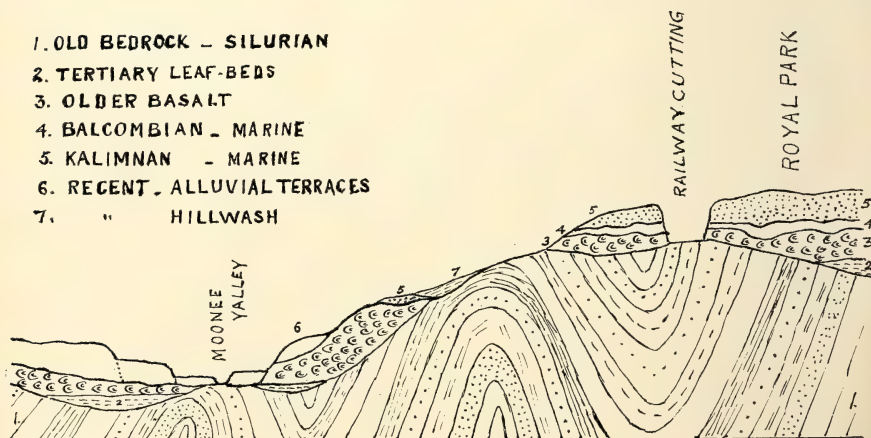


Fig. 3 — Diagrammatic Section, Royal Park.

investigate its contents. The Balcombian band is comfortably accessible, but fortunately the Kalimnan beds are out of reach, and it is thus possible for any student to collect from the northern side without fear of obtaining a mixed fauna — a state of affairs which might easily happen by indiscriminate work on the southern face. It will be clear, therefore, that we can fall back on our examination of the northern side to prove the interpretations of the southern. Further points may also be obtained on the "Older Basalt" and the mode of deposition of the successive shore-line accumulations of Balcombian, and subsequently of Kalimnan times.

Fossil collecting at Royal Park may yield evidence in many directions, *First*, it will show us the remains of invertebrate creatures ranging from the lowest to the highest forms of life, starting with the foraminifera, passing through the sponges, corals, sea-eggs

or sea-urchins, lace corallines, lampshells, bivalves, univalves and higher mollusca of the nautilus type.

Second, shallow water or shore-line conditions are indicated by the numerous fragmentary remains as well as the presence of such forms as limpets, mutton-fish-shells and the common long spirals, cones, whelks and periwinkles. *Third*, these fossil remains are all extinct and very ancient, even though some may at first sight appear very similar to living forms. Thus the age of rocks can be fixed, the conditions under which the rocks were deposited, and the types of animal life which existed at the time.

Then as evidence of further subsidence of this area (after Balcombian) there is the definitely overlapping marine Kalimnan series with its distinct suite of fossils and the presence of leaves, fruits and logs showing the nearness of the old land.

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F.N.C.V. DIARY OF COMING EVENTS

New Members -

Ordinary:

Miss Suzanne Smart, 14 Stanley Grove, Canterbury, 3126 (*Marine Biology and Entomology*)

Country:

Mr. Ian D. Try, P.O. Box 27 Monbulk, 3793 (*Botany and Mammal Survey*)

Mr. H. F. Olsen, 134 Englefield Road, Oxley, Qld., 4075 (*Mangroves*)

Junior:

Marc Nicholls, 24 Bowen Road, East Doncaster, 3109.

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated)

Wednesday, 18 September — Microscopical Group meeting.

Thursday, 19 September — Conservation Group meeting at 15 Drummond St., Carlton at 8.00 p.m.

Thursday, 19 September — Day Group meeting, Maranoa Gardens. Stop 54 on Mont Albert tram, then via Parring Road at 11.30 a.m. Bring lunch.

Wednesday, 25 September — F.S.G. meeting in Conference Room, National Museum, at 8 p.m. "Leaf-litter Ecology", Mr. B. Leonard.

Thursday, 30 October — M.S.G. meeting at Arthur Rylah Institute, 123 Brown St., Heidelberg at 8.00 p.m.

Monday, 7 October — Marine Biology and Entomology Group meeting in Conference Room, National Museum at 8.00 p.m.

Wednesday, 9 October — Geology Group meeting.

Thursday, 10 October — Botany Group meeting.

F.N.C.V. EXCURSIONS

Sunday, 15 September — Yellingbo B.O.C. Centre. This excursion will be to the area where the Bird Observers Club has a survey centre for the study of the Helmeted Honeyeater and other birds of the district. There is a hut on the property where plant and bird lists are displayed, 3 barbecues and plenty of tank water. Those planning to walk around the survey circuit will need gumboots as there is a swampy area to cross. The coach will leave Batman Avenue at 9.30 a.m., fare \$2.00, bring one meal and a snack.

Saturday-Sunday, 19-20 October — Bendigo-Maryborough weekend excursion. Saturday the excursion will be led by Mr. Frank Robbins who has uncovered new evidence of glacial activity in the Heathcote area, Saturday night will be spent at the Oval Motel in Bendigo D.B.B. and Sunday we will proceed to Maryborough where the Maryborough F.N.C. will show us around including a visit to the Cosstick Reserve. The coach will leave Flinders Street from the Gas and Fuel Corporation at 8.30 a.m. Bring picnic lunches. Cost for fare and motel is \$21.00 which should be paid to the Excursion Secretary by the end of September, cheques being made out to Excursion Trust. Any geologists or other members wishing to join the party could meet at the Spring Plains turn off on the Lancefield-Mia Mia Road approximately 66 miles from Melbourne.

Thursday, 26 December — **Friday, 3 January** — Falls Creek Excursion. The party will travel to Falls Creek on Boxing Day remaining there with day trips in the area until Thursday, 2 January when it will travel to Alexandra stopping there overnight and reaching Melbourne on Friday, 3 January. Accommodation with full board has been booked at Spargo's Motel at \$14.50 per day and this should be paid for individually but the cost of the motel at Alexandra dinner bed and breakfast is included in the fare of \$50.00 which should be paid to the Excursion Secretary by the end of October.

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- The Sugar Glider
(*Petaurus breviceps*)
see text p 246

Photo: J. Wallis

With the late arrival of this issue of the *Victorian Naturalist* come apologies from the Editor.

As mentioned last month, some delay was to be expected due to the change in printing methods from letterpress to offset.

Unfortunately, more problems occurred than were anticipated; but these should not recur, so that the October issue should not be delayed.

It is hoped that members and readers have not been inconvenienced too greatly.

The Land Conservation Council has recently released its Report on the East Gippsland Study Area. This area consists of the land in the Shire of Orbost, bounded on the west by the Snowy River and the boundary between Shires of Orbost and Tambo from the Snowy River to the sea, on the north-east by the Victoria-New South Wales border, and on the south by Bass Strait. It covers just over 4% of the area of Victoria, of which eighty-eight per cent is public land.

The Council invites written submissions as to how this public land may be better used to meet the needs of the people of Victoria.

These submissions should be received by the Council before the 21 October, 1974, after which they will be considered, before any recommendations are made concerning the use of this land.

Copies of the Report cost \$3.00, and may be obtained at L.C.C. office in St. Kilda Rd., Melbourne.

Landslides in Victoria, Australia

by

R. S. EVANS* and E. B. JOYCE*

Introduction

An almost complete spectrum of landslide types is found in Victoria. Early Cretaceous arkose and mudstones and Tertiary sandstones and mudstones are the most susceptible rock types. Many of the landslides listed have occurred in these rocks.

The Otway Ranges, the South Gippsland Hills and the Coleraine area show predominantly translational and rotational slides with an element of rock fall. Lobate earth flows also occur. In the Eastern Highlands earth and block flows and falls on very steep slopes are frequent. The unconsolidated Tertiary sediments in the Parwan Valley and Werribee Vale fail primarily by flowing as do similar sediments at Bullenmerri near Camperdown.

Important Areas of Landslide Activity

The notable instability of the Early Cretaceous arkose and mudstones of the Otway Ranges is due to the strong jointing, youthful topography, active undercutting by the ocean and rivers, and most significantly, the mechanism of weathering along bedding and joints, which largely dictates the type of failure.

Numerous flow and slide failures have occurred in the South Gippsland Hills in a similar geological environment to that of the Otway Ranges. The only difference is that Older Volcanics, usually heavily weathered, cap many of the hills, and montmorillonite from weathering of the basalt would aid the formation of landslips. Terracette formation and soil creep downslope are especially common.

Major Mitchell (1839) commented on landslides in the Glenelg River Valley near Coleraine. This observation was

made before any land clearing and farming took place and illustrates how landslides are a natural process in the degradation of the landscape. Failures in the Coleraine area occur in Early Cretaceous arkose and mudstones beneath a laterite capping. The lower part of the slope collapses causing retreat of the plateau edge of the Dundas Tableland.

Slope failures in the Parwan Valley and Werribee Vale area are due primarily to the high clay content of the poorly-cemented Tertiary sediments.

Relationship between Landslides and Rainfall

The location, intensity and frequency of rainfall are key factors in landslide distribution in Victoria. The Otway Ranges and the South Gippsland Hills have high annual rainfalls. In contrast, the Parwan Valley and Coleraine areas have only an average rainfall. Of far greater importance is the frequency and intensity of rainfall. Two exceptionally wet periods occurred around 1916 and 1952 and many of the landslides noted below took place during these periods.

Conclusion

The location of landslides in Victoria appears to be predominantly controlled by rock or soil type, with petrology, structure and the mechanism of weathering playing major roles. For rock type alone, observations in Victoria indicate that broadly the susceptibility to failure can be expressed — sedimentary

* School of Geology University of Melbourne

> volcanic > metamorphic > plutonic, with sedimentary rocks being most liable to slipping. Topography is of secondary importance but still significant. The presence of specific clay minerals, chlorite, montmorillonite and less importantly, illite, markedly reduces stability and so flow failures predominate. Rainfall distribution over Victoria can be broadly related to landslide

location and frequency, but rainfall is usually only a trigger, and its effect is secondary to that of rock or soil type.

NOTE

This review of landslides in Victoria formed part of a B.Sc. (Hons) report prepared in 1973 by R. S. Evans under the supervision of E. B. Joyce in the School of Geology at the University of Melbourne.

TABLE 1

Location and Brief Description of Landslides in Victoria

The landslides listed here are given in order of approximate age, either known or estimated. The ages of landslides No. 1 to 11 are unknown, but they are presumed to have occurred before 1900.

No.	Location	Description	Source
1	Lake Tarli Karng, Eastern Highlands.	Large rock slide in Devonian rhyolites and rhyodacites.	Hills (1940), and Spencer- Jones (1971).
2	Bogong and Dargo High Plains, Eastern Highlands.	Rock Rivers in Tertiary basalt.	Talent (1965).
3	Cobberas-Wombargo area, Eastern Highlands.	Rock Rivers in Devonian rhyodacites.	Talent (1965).
4	Parwan Valley, Bacchus Marsh.	Mud flow in Tertiary sediments.	Evans (1973), and Forbes (1948).
5	Dundas Tablelands, Coleraine.	Mud flows and slides in Tertiary sediments.	N. Rosengren (pers. comm.).
6	Valley of Moorabool River (West Branch), Bungal.	Slides and flows in weathered granite and Tertiary sediments.	Currey & Cox (1972), and McDonald (1972).
7	Cathedral Ranges, near Buxton.	Mud flow in Silurian siltstones.	Hills (pers. comm.).
8	Curdies River, Port Campbell.	Flows and slides in Tertiary sediments.	E. B. Joyce (pers. comm.).
9	Olivers Hill, Frankston.	Slides in Tertiary sedi- ments overlying Older Volcanics and Devonian granite.	E. S. Hills (1940), and (pers. comm.).
10	Soapy Rocks, Anglesea.	Block slides in Tertiary sediments.	E. B. Joyce (pers. comm.).

TABLE 1 CONTINUED

No.	Location	Description	Source
11	Lake Bullenmerri, Camperdown.	Flows and rotational slides in Tertiary sediments below Newer Volcanic capping.	Evans (1973).
12	Johanna River, Lavers Hill, Otway Ranges.	Slides in Early Cretaceous arkose.	Medwell (1971).
13	Coranderrk Creek, Healesville.	Slide in Devonian silt stones; approximately 1916.	E. S. Hills (1940), and (pers. comm.).
14	West side of Mt. Dandenong, Montrose.	Large landslip in Devonian dacite; approximately 1916.	E. S. Hills (pers. comm.).
15	Balcombe Bay, Mornington.	Slides in Tertiary Balcombe clay; approximately 1916, and continuing.	E. S. Hills (pers. comm.).
16	Eastern View.	Rotational slides in Tertiary sediments and Early Cretaceous arkose; 1916 and 1952.	Evans (1973), and Spencer-Jones (1952).
17	S.E.C. No. 4 Power Station, Kiewa, Eastern Highlands.	Slide in Ordovician orthogneiss.	Thomas (1946).
18	On railway line between Hamilton and Coleraine.	Rotational slide in Tertiary sediments; 1948.	Thomas (1948).
19	Yallourn North Open Cut, Gippsland.	Large translational slide in Brown Coal Open Cut; 1950.	Urie (1950).
20	Cardinia Creek, Ferntree Gully.	Rotational slide across Puffing Billy Railway Track — 100 m of track covered; December 1952 and August 1953.	Downs (1963).
21	Werribee Vale, Bacchus Marsh.	Rotational slide in Tertiary sediments; 1952.	Evans (1973), and Harding (1952).

TABLE 1 CONTINUED

No.	Location	Description	Source
22	5 km south of Forrest, Otway Ranges.	Large translational slide in Early Cretaceous arkose; June, 1952.	Knight (1953).
23	Foster to Fish Creek road, South Gippsland.	Slip in Silurian siltstones and mudstones; 1963.	C.R.B. (1963).
24	Metung, Chinaman's Creek, East Gippsland.	Compound rotational slide in Tertiary clays, 1964.	M. Williams (pers. comm.).
25	4 km north-west of Colros- sie, South Gippsland.	Major slip in Tertiary sediments and weathered Older Volcanics; 1964.	C.R.B. (1964).
26	Warragul to Korumburra road, South Gippsland.	Slip in Early Cretaceous sediments, across road; 1965.	C.R.B. (1965).
27	1.6 km north of Carrajung, South Gippsland.	Major rotational slide in Early Cretaceous arkose with "sinkholes" formed on the slide; 1969.	C.R.B. (1969a).
28	1 km south of Carrajung, South Gippsland.	Slip in Early Cretaceous sediments, across road; 1969.	C.R.B. (1969b).
29	Windy Point, Great Ocean Road, Lorne.	Translational rock slide in Early Cretaceous arkose; from 1968 to 1971.	Evans (1973), and Williams and Muir (1972).
30	Ben Cruachin, Eastern Highlands.	Rock flows in Silurian siltstones; 1971.	Evans (1973).
31	Freestone Creek, Eastern Highlands.	Complex slip, mainly in Ordovician siltstones, 1971.	Evans (1973).
32	Stoney Creek, Shoreham, Western Port.	Failure in weathered Older Volcanics, with older slides reactivated by pres- ence of dam; February to March, 1973.	D. T. Currey (pers. comm.).
33	Eglinton Cutting, Maroondah Highway, Alexandra.	Rock fall in road cutting, Devonian siltstones; 7 August, 1973.	M. Ervin (pers. comm.).

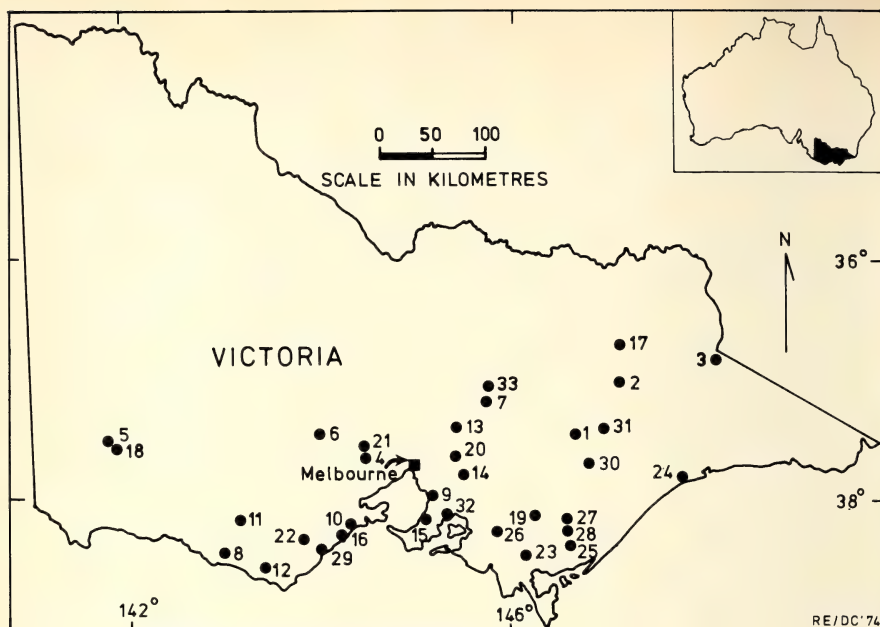


Figure 1

Location of landslides in Victoria, Australia. See Table 1 for details of numbered localities.

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The Origin of Generic Names of the Victorian Flora

Part 2 — Latin, Greek and Miscellaneous

continued from 91(7)

by JAMES A. BAINES

Centipeda. Latin for centipede, meaning 100 feet. Loureiro gave the name in 1790 because of the creeping stems of some species. Buchsbaum in 'Animals without Backbones' states that the number of legs in different genera of centipedes varies from 30 to 346, but the average is 70 (35 pairs). They belong to the class Chilopoda (which is Greek for 1000 legs), whereas millipedes (= 1000 legs) have only about twice the number of legs as centipedes, and belong to the class Diplopoda (=double-legged). Victoria has 3 native species of *Centipeda*, all known as Sneezeweeds. *C. cunninghamii* was formerly in the genus *Myriogyne*, the name of which means 10,000 women!

***Centranthus.** Gk kentron, a spur; anthos, flower; from the spurred flower of *C. ruber*, Red Valerian, formerly called *Valeriana*. The spelling variant *Kentranthus* is incorrect, despite its being nearer to the Gk derivation.

Centrolepis. Gk kentron, a spur (cf. kenteo, to prick, see the entry *Centaurea*); lepis, a scale; the two floral

bracts having long points. This generic name (source of the family name Centrolepidaceae) is also used as a common name, but a name such as Spurscale would seem to be preferable, especially as I have heard *Centrolepis* accented on the first, second and third syllables! Victoria has six species of this mainly Australian genus.

***Centunculus.** Latin name of a plant in Pliny, the identity of which is obscure. The word also means a small patch, diminutive of cento, patchwork covering, and Dillenius chose the name (according to Gilbert-Carter) because of the plant's insignificance, though the author citation is L. (1753). **C. minimus*, Chaffweed, is very close to *Anagallis*, Pimpernel.

***Cerastium.** Gk kerastes, horned, from keras, a horn; in allusion to the horned shape of the seed capsule. Victoria has 4 introduced species, all known as various kinds of Chickweed, 3 of them with the adjective Mouse-ear.

Mammal Survey Group Contributions VII

Mammals of the Cardinia Creek Reservoir Site

by
D. MUNRO*

INTRODUCTION

A new reservoir has been constructed on the upper reaches of the Cardinia Creek, near Emerald, some 44 kilometres south east of Melbourne. When filled it will form a sheet of water some 1,200 hectares in area. This reservoir will provide storage for waters diverted from the Upper Yarra and Thompson River catchments and will have only a small local catchment.

To determine what species of mammals were present in the area before it was flooded, the Mammal Survey Group of F.N.C.V. carried out two sample surveys late in 1969. This paper reports the results of those surveys. The names of members who took part are given in the author's acknowledgements.

DESCRIPTION OF THE AREA

At the time the surveys were carried out most of the farms, small holdings and "weekenders" had been abandoned and partly dismantled giving the area a most unprepossessing appearance.

The first survey was centred on Bishop Road and covered an area most of which will be submerged. The second was centred on Redhill Road and covered an area which will form part of the margin of bush on the southern edge of the reservoir. The areas covered by the surveys are shown in Figure 1.

The first survey appeared to contain the richest vegetation that was then accessible from the northern boundary of the reservoir site. Much of the land had previously been cleared for agricultural use but there were areas

sparsely covered with native vegetation. A few isolated tall trees were found, mostly along the roads.

On the western slope of the valley to the east of Bald Hill there was a fairly large block of natural bush.

At the site of the second part of the survey (north of Redhill Road from McMillans Road to about 1.5 kilometres east of the Beacon Hill Golf Club House) the natural bush was taller and well developed. Near the road there was a strip of exotic trees and shrubs mixed with natural bush. Part of this area had been cleared for grazing but a portion of the hillside (which had been selectively logged), the creek beds and the roadside contained natural vegetation.

A description of the vegetation of the study area is given in Appendix II.

The soils, geology and rainfall of this area have been described (Melbourne and Metropolitan Board of Works, 1969).

METHODS

Methods of trapping and spotlighting have been described previously (Seebeck, Frankenberg and Hampton, 1968). Mist nets were not used.

RESULTS

A systematic list of the mammal species recorded is given in Table I and the extent of the survey effort with all trapping, spotlighting and other results is given in Table II.

* Mammal Survey Group of Victoria, C/- Hon. Secretary, 11/104 The Avenue, Parkville, Victoria, 3052.

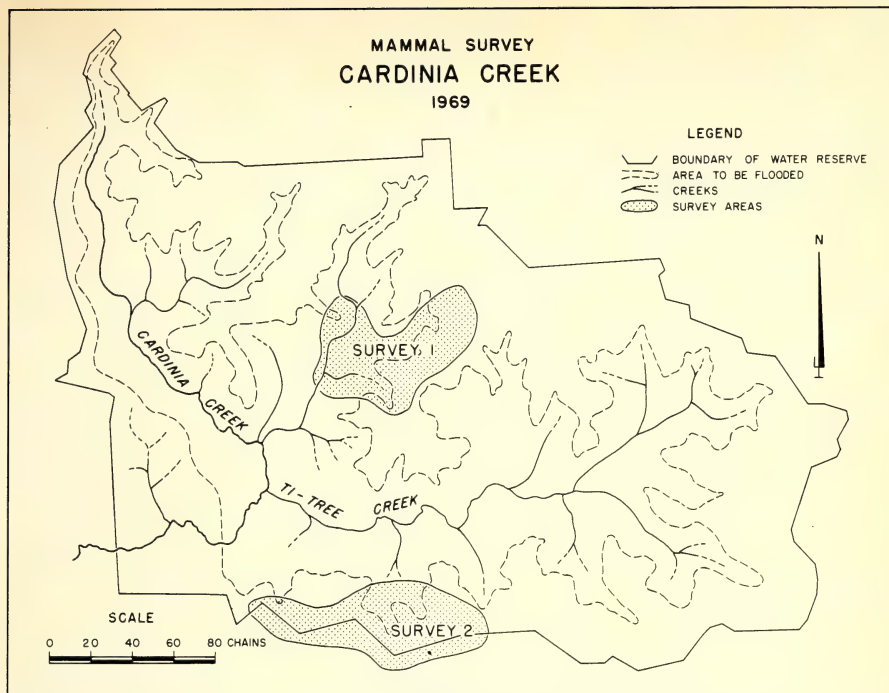


Figure 1

Reference specimens which have been retained by the Fisheries and Wildlife Division, Victoria, are listed in Appendix I.

NOTES ON THE SPECIES RECORDED

Echidna, *Tachyglossus aculeatus*.

Many *Echidna* diggings were seen at each of the survey sites though no live specimens were encountered. This species appears to be common and its presence was also reported to us by local residents.

Common Wombat, *Vombatus ursinus*.

Characteristic scats and burrows were found in the Bishop Road survey, and local residents said these animals were common there. No evidence of wombat was found on the southern slopes of the reservoir site.

Eastern Grey Kangaroo, *Macropus giganteus*.

Skeletal material of an animal not long dead was found in the bush off Redhill Road. This was subsequently identified as *Macropus giganteus* by the Fisheries and Wildlife Division. No live animals were seen.

Black Wallaby, *Wallabia bicolor*.

Two were seen by spotlight near Westland Road, one near Redhill Road and two more during the day north of Redhill Road. At the time of the survey this species appeared to be relatively common there.

Southern Bush Rat, *Rattus fuscipes*.

This species was common in both areas and was present in most of the available habitats. The numbers caught were close to the average number trapped during surveys in similar habitat elsewhere in southern Victoria.

Black Rat, *Rattus rattus*.

The only specimen trapped was in thick tea-tree and hakea 90 metres north of the Beacon Hills camp.

Platypus, *Ornithorhynchus anatinus*.

Fresh Platypus tracks were found on a mudbank in a creek near the western end of Bishop Road.

Brown Antechinus, *Antechinus stuartii*.

Ten individuals were trapped in surroundings which varied from dense tangles of wiregrass and bracken near a running creek, to more open tea-tree regrowth and fallen logs on the dry hillsides. All specimens caught were female and those caught in November were lactating. This species appeared to be common in both areas.

Brush-tailed Possum, *Trichosurus vulpecula*.

Though no specimens were seen the presence of this species was confirmed by the discovery of many fresh droppings in an abandoned farmhouse on Redhill Road.

Sugar Gilder, *Petaurus breviceps*

One individual, thought to be immature, was observed in a peppermint eucalypt during spotlighting along Redhill Road.

Common Ringtail, *Pseudocheirus peregrinus*

This species did not appear to be as abundant as in other comparable areas studied by this Group. Four were seen adjacent to Westland Road and four others near Redhill Road.

TABLE I

A systematic list of the mammals recorded from the Cardinia Creek Reservoir site.

Order MONOTREMATA

Family TACHYGLOSSIDAE

1. Echidna

Tachyglossus aculeatus (Shaw, 1792)

Family ORNITHORHYNCHIDAE

2. Platypus

Ornithorhynchus anatinus (Shaw, 1799)

Order MARSUPIALIA

Family DASYURIDAE

3. Brown Antechinus

Antechinus stuartii Macleay, 1841

Family PHALANGERIDAE

4. Brush-tailed Possum

Trichosurus vulpecula (Kerr, 1792)

Family PETAURIDAE

5. Sugar Glider

Petaurus breviceps Waterhouse, 1839

6. Common Ringtail

Pseudocheirus peregrinus (Boddaert, 1785)

Family VOMBATIDAE

7. Common Wombat

Vombatus ursinus (Shaw, 1800)

Family MACROPODIDAE

8. Eastern Grey Kangaroo

Macropus giganteus Shaw, 1790

9. Black Wallaby

Wallabia bicolor (Desmarest, 1804)

Order RODENTIA

Family MURIDAE

10. Southern Bush Rat

Rattus fuscipes (Waterhouse, 1839)

11. Black Rat*

Rattus rattus (Linnaeus, 1758)

12. Eastern Water Rat

Hydromys chrysogaster Geoffroy, 1804

Order LAGMORPHA

Family LEPORIDAE

13. Rabbit*

Oryctolagus cuniculus (Linnaeus, 1758)

*Introduced species

Eastern Water Rat, *Hydromys chrysogaster*

Footprints of an Eastern Water Rat were found near the platypus tracks referred to earlier, in a creek near the western end of Bishop Road.

Rabbit, *Oryctolagus cuniculus*

Rabbit warrens, scats and digs were common throughout the reservoir site.

DISCUSSION

In two brief surveys, eleven native species were recorded. Of special interest were the Eastern Water Rat, Platypus, Sugar Glider and Eastern Grey Kangaroo which are less frequently

recorded in similar areas studied by this Group. It is to be hoped that the area surrounding the reservoir, which will be securely fenced, will provide sufficient suitable habitat for these and other species.

While it is unlikely that there will be a sufficiently large residual population of Eastern Grey Kangaroo it is possible that the species may be reintroduced. Once the lake is established the many shallow stretches should favour both Platypus and Eastern Water Rat provided that the residual populations can adapt to the changing water regime.

The other native species recorded are

TABLE II
Summary of Survey Results

SURVEY	BISHOP ROAD	REDHILL ROAD	TOTAL NUMBER
Date	October 1969	November 1969	
Number of trap nights	95	78	173
Number of spotlight hours	15	10.5	25.5
(a) <i>Number of animals caught per 100 trap-nights.</i>			
Brown Antechinus	3.2	9.0	10
Southern Bush Rat	12.7	9.0	19
Black Rat*	—	1.3	1
(b) <i>Number of animals seen per spotlight-hour.</i>			
Sugar Glider	—	0.1	1
Common Ringtail	0.27	0.38	8
Black Wallaby	0.13	0.1	3
(c) <i>Number of animals seen during daylight.</i>			
Black Wallaby	—	2	2
(d) <i>Species recorded from other evidence.</i>			
Echidna	+	+	
Platypus	+		
Bush-tailed Possum		+	
Wombat	+		
Eastern Grey Kangaroo		+	
Black Wallaby	+		
Eastern Water Rat	+		
Rabbit*		+	

*Introduced species.

fairly common in south central Victoria. Whether any will remain in the area after the inevitable noise, extensive clearing and general disturbance of habitat associated with development works is open to conjecture.

It is known that the densely vegetated slopes of the Dandenong Ranges to the north of the dam site hold substantial numbers of Southern Bush Rat, Brown Antechinus and Common Ringtail. Those species should therefore have the potential to recolonise the environs of the Cardinia Reservoir provided enough suitable habitat is retained.

It would be of interest to conduct follow-up surveys in this area to determine the effect of such an immense change of environment on the mammal fauna.

Acknowledgements

The following members of the Mammal Survey Group took part in the surveys which provided the data upon which this paper is based: — A. Borsbaum, R. Dale, J. Hampton, A.

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We wish to acknowledge the co-operation of the Melbourne and Metropolitan Board of Works which granted permission for us to work in the area. The equipment used was purchased from a grant made by the M. A. Ingram Trust. Protected species were handled under the provisions of a permit issued by the Fisheries and Wildlife Division, Victoria.

Liki Muceniekas drew the map for Figure 1.

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Appendix I

Reference specimens collected by the Group from the Cardinia Creek Reservoir site and lodged in the collection of the Fisheries and Wildlife Division, Victoria.

SPECIES	SURVEY AREA	REG. No.	SEX
<i>Antechinus stuartii</i>	Bishop Road	5567	♀
	Redhill Road	5245	♀
<i>Rattus fuscipes</i>	Bishop Road	R.4046	♂
	Bishop Road	R.4084	♀
	Redhill Road	R.4086	♀
	Redhill Road	R.4087	♂
	Redhill Road	R.4088	♀
	Redhill Road	R.4089	♀
<i>Rattus rattus</i>	Redhill Road	R.4052	♂
<i>Macropus giganteus</i>	Redhill Road	M.2048	—

Appendix II

THE VEGETATION OF CARDINIA CREEK RESERVOIR SITE

The physical structure and dominant species in each stratum is given according to the method described by Wood and Williams (1966)

Survey	Situation	Canopy	Understorey	Shrubs	Ground Cover
Bishop Road	Slopes	Open to mid-dense. Height 9-12m <i>Eucalyptus macrohyncha</i>	Nil	Dense Height 2-3m <i>Leptospermum</i> sp. <i>Hakea</i> sp. <i>Banksia</i> sp.	Open to dense <i>Pteridium esculentum</i> grasses
	Gullies	Dense Height to 18m <i>E. ovata</i> occasional <i>E. viminalis</i>	Generally open Height variable, 3-9m <i>Acacia mearnsii</i> eucalyptus saplings	Dense Height 2-3m <i>Leptospermum</i> sp. <i>Hakea</i> sp. <i>Helichrysum dendroideum</i>	Dense to very dense Height to 1m <i>Tetrahena juncea</i> <i>Pteridium esculentum</i> sedges and ferns
Redhill Road	Slopes	Mid-dense Height to 15m <i>E. radiata</i> <i>E. macrohyncha</i> <i>E. obliqua</i>	Nil	Sparse Height 1-3m <i>Leptospermum juniperinum</i> <i>Banksia marginata</i>	Dense to very dense <i>Poa australis</i> <i>Tetrahena juncea</i> <i>Pteridium esculentum</i> sedges
	Gullies	Mid-dense Height 20-22m <i>E. obliqua</i> <i>E. macrohyncha</i> <i>E. viminalis</i> <i>A. dealbata</i>	Very sparse Height 3-4m occasional tree ferns	Open to dense Height 1-2m <i>Leptospermum</i> sp. <i>Helichrysum dendroideum</i>	Dense <i>Poa australis</i> <i>Tetrahena juncea</i> <i>Pteridium esculentum</i> sedges and ferns

A Comparison of the Colonizing Abilities of Native and Introduced Bird Species onto Islands around Australia and New Zealand

by

IAN ABBOTT*

Abstract

Only twelve definite cases of native land bird species successfully colonizing temperate islands around Australia and New Zealand exist. Six of these involve *Zosterops lateralis*, a species that moves in flocks.

In contrast, eleven introduced British species have made a total of 78 successful colonizations since the 1860s. It is argued that a basic difference in behaviour (flocking v. non-flocking) is responsible for the difference in colonizing success.

Introduction

Even on ornithologically well known islands such as Kangaroo Island, Tasmania or New Zealand, the arrival of straggling native land birds from the nearest mainland is a relatively rare event (Abbott, 1972, 1973, in press; Kinsky 1970). As might be expected, establishment of such stragglers is even more infrequent, with 12 definite cases and 17 others of varying likelihood. The definite cases are : Tasmania, one species; Kangaroo Island, one; Rottnest Island, one; Bald Island, one; New Zealand, two; Norfolk Island, two; and Chatham, Snares, Auckland and Campbell Islands, one each. These are discussed in detail below, where necessary.

Native species

Dacelo novaeguinae, Bald Island (Western Australia). Established when Storr (1965a) visited the island. Kookaburras were introduced into Western Australia at Perth in 1897 (Serventy and Whittell 1967).

Cacatua roseicapilla, Kangaroo Island. Established after 1930. Details in Abbott (in press).

Hirundo tahitica, New Zealand and Norfolk Island. Before 1958, this species had been recorded in New Zealand only three times, presumably having straggled from Australia (Kinsky 1970). In that year it first bred, and is now widespread (Falla et al. 1967, Tunnecliffe 1968). Established on Norfolk Island about 1969 (Smithers and Disney 1969). Ten individuals reached Chatham Island on 11 June 1970 (Hollay 1971), but their fate is not recorded.

Ephthianura albifrons, Tasmania. Although Legge (1902) summarized the facts known on this species, Sharland (1958) makes no mention of its recent history in Tasmania. Gould (1865: 377) recorded this species as breeding on some of the islands in eastern Bass Strait, but he specifically stated that it was not present in Tasmania when he visited the island (1838-9). Ewing (1855, but not 1842) recorded it, presumably as a casual species. The first breeding record was at Cornelian Bay, near Hobart (Swan 1869). The species then spread northwards, reaching Ross in 1885 and Falmouth in 1892 (Legge 1902). Littler (1910) records it from the north-west coast. *Gerygone fusca*, Rottnest Island (Western Australia). Established about 1950 (Storr 1965b: 178).

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Zosterops lateralis, New Zealand and surrounding islands. This species apparently reached the South Island shortly after New Zealand was settled by Europeans, but the evidence is unsatisfactory (Mees 1969). The first reliable record was in 1856 (Oliver 1955). It quickly spread to the North Island where it first bred in 1865 (Mees 1969). Chatham Island was colonized on or before 1865 (Mees 1969), Campbell Island between 1840 and 1873 (Westerkow 1960) and Norfolk Island in 1904 (North 1904). The species has also established on Auckland Island (date unknown) and Snares Island (after 1888) (Warham 1967). *Z. lateralis* is only vagrant to Raoul Island (Kermadec Group) and Macquarie Island, and curiously has never been recorded from Lord Howe Island.

The 17 doubtful cases are: *Cacatua roseicapilla* on Tasmania, probably introduced by man (Abbott 1973); *Falco cenchrodies* on Lord Howe Island, regular breeding not proven (Disney and Smithers 1972) and on Flinders and King Islands; *Dacelo novaeguinae* on Maria Island (Tasmania), possibly introduced; *Coturnix pectoralis*, *Accipiter cirrocephalus*, *Zoothera dauma* and *Pardalotus quadragintus* on Flinders Island; *Acanthiza ewingi*, *Meliphaga chrysops*, *Phylidonyris fulvifrons*, *Paradalotus punctatus*, *Acanthornis magnus* and *Pachycephala pectoralis* on King Island. In the case of the records from Flinders and King Islands, it is quite likely that most of these species were simply overlooked in the first thorough surveys of 1912 and 1887 respectively. It is possible that *Rhipidura leucophrys* and *Grallina cynaoleuca* on Kangaroo Island are on the threshold of establishment (Abbott, in press).

Six of the ten cases of passerines definitely establishing on islands involve one species, *Zosterops lateralis*. This is a species that moves in flocks except when nesting. The Tasmanian population,

from which the New Zealand population is thought to have originated (Mees 1969), migrates to the Australian mainland each autumn.

British species introduced

The above ten cases of successful colonization by native passerines markedly contrasts with 78 cases involving up to 11 species of British passerines successfully introduced by man into New Zealand and southern Australia since the 1860s. Of 11 such species established in New Zealand, the following numbers are established on the outlying islands (references as above, and Williams 1953): Raoul, 4; Chatham, 8; Norfolk, 6; Lord Howe, 3; Snares, 4; Auckland, 9; Campbell, 8; Antipodes, 1 (but no modern list); Macquarie, 2. Of the eight European passerine species successfully introduced into southern Victoria (Wheeler 1967), up to six have successfully colonized the islands in Bass Strait as follows: King, 6; Rodondo, 2 (Bechervaise 1947); Hogan, 1; Curtis, 1; Deal, 5. Seven such species are established on Tasmania, but six of them may have been separately introduced by man. Of nine species of British passerines established near Adelaide (Condon 1969), five have colonized Kangaroo Island successfully (Abbott, in press). No European passerines have colonized Rottneest Island from mainland Western Australia (Storr 1965b).

Discussion

Is the difference in number of successful colonizations between native and British bird species a result of behavioural differences or simply a result of native bird species having had thousands of years in which to colonize the islands (in that all that remains are the highly sedentary species)? This last appears unlikely. There are over 30 passerine species in southern Victoria and South Australia that have never been recorded from the offshore islands.

Also, over 100 species of passerines in eastern New South Wales have never been recorded from New Zealand.

It seems more likely that a basic difference in behaviour between most native passerine species and most British ones is responsible for the differing colonization successes. Most of the British passerines introduced are partial migrants in Britain where large flocks are formed at least twice a year (Witherby et al. 1938). Most Australian

and New Zealand passerines do not do this. Although many Australian native species are nomadic, this cannot be regarded as a preadaptation to colonizing islands. Nomadism involves irregular movement to more favourable environments, usually those more coastally placed. On the other hand, species that flock for migration are preadapted for getting to islands in sufficiently large numbers to establish a viable population.

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Aboriginal Axe-stone Quarries near the Howqua River, North-eastern Victoria

by

A. M. SCHMIDT*

In a paper on the geology of the Howqua River area in North-eastern Victoria, Teale (1919) states: "... platy diabase was favoured by the natives for making their stone axes and several small quarries occur close to the road about half a mile north of the old road terminus." Since Teale's publication, the Howqua axe-stone quarries have been briefly referred to by three authors (Mitchell 1961, Massola 1969 and Crichton 1964) but none has published a detailed account of them. A Mr. D. Stone (1961) in a newspaper article also makes mention of the quarries.

The note published by Crichton is the most significant, because it arose out of first-hand investigations and indicates that he found what he describes as a "hand artefact with partly ground edges" (ibid. p. 105) in one of the quarries. The comments of Mitchell are acknowledged by him as a direct quotation from Teale while Massola's remarks paraphrase the original writer. Massola's statement that "the most characteristic (quarry) is on an outcrop of diabase on Lickhole Creek, about a mile above Malcolm's Creek junction", is based on a misreading of Teale. Teale was referring not to a quarry at this location but to an outcrop of platy diabase.

Teale mentions "several small quarries" (ibid. p. 48) but after a careful investigation of the area, with the help and co-operation of K. Gibson, G. Stoney and J. Ware, only two quarries were located. This paper describes these quarries.

A type of stone highly favoured by the Aborigines for axe-making is a dense, greenish rock sometimes referred to as

'greenstone' — an imprecise term for a wide range of metamorphosed basic igneous rocks. Earlier workers have described this rock as 'diabase', a term used with different meanings in several different countries but no longer widely accepted and to avoid confusion will not be used here. Greenstones commonly have a fine grained interlocking texture and when fresh (that is, unweathered) tend to take subconchoidal fractures and develop sharp edges. The majority of reported Aboriginal quarries in Victoria consist of this type of material (Mitchell 1961, p. 71-4). The most extensive and well-known quarry is at Mt. William near Lancefield (Howitt 1904, Casey 1971). The greenstone at the Howqua sites is derived from a metamorphosed basaltic lava and will be referred to as a 'metabasalt'. This metabasalt is closely joined and breaks easily into tabular multi-faceted pieces. Fresh pieces show a distinct subconchoidal fracture. The Howqua sites are located in a belt of Cambrian greenstones running in a south-easterly direction in the Howqua River valley. The river passes through a deeply dissected valley with steep slopes, rising to narrow ridges. (Teale 1919, pp. 37-9).

The predominant trees in the vicinity of both sites are *Eucalyptus pauciflora* (White Sallee) and *Eucalyptus radiata* (common or Narrow-leaved Peppermint) with an occasional stand of *Acacia decurrens* (Black Wattle). Mainly introduced species of 'scrubby' type vegetation surround the quarries, namely *Hypericum androsaemum* (Tutsan),

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Hypericum perforatum (St. John's Wort),
Rosa rubiginosa (Briar Rose) and *Pteridium aquilinum* (Bracken Fern).

Site one is located on the north-eastern side of a steep spur about 470 metres north of the Howqua River (Plate 1). In plan, the quarry area is roughly circular, approximately fifteen metres in diameter and situated on a 1000 foot (487 metre) map contour line. Fragments of metabasalt are densely concentrated over this area to an unknown depth (plate 2). They vary in size from about 18 x 10 x 10 cm to quite small, thin pieces a few cm in length. At one place, the fragments fifteen to twenty cm below the surface were noted to be consistently smaller than the surface blocks but it is not known, at present, whether this feature extends throughout the quarry.

On the southern perimeter of the main concentration of fragments there is a patch of chippings possibly resulting from the flaking of blocks into axe blanks. Five metres to the west of this area of small chippings, there is a second

apparent working area. At the site, there is a marked circular depression 0.5 metres in depth and roughly nine metres in diameter with a linear extension of five metres.

Site two (Plate 3) is similar in many features to No. one. It is situated 640 metres west of Site one on a north-east/south-west spur, has a north-easterly aspect, and similar-sized stone fragments occupying approximately the same area as Site one. As with Site one, there are a number of apparent working places with concentrations of quite small fragments, many of which are no longer than four cm in length.

Immediately to the west of the quarry, there are three shallow depressions. Each covers an area of approximately 20 sq. metres and is about 0.5 metres in depth. A fourth depression immediately above the concentration of rocks closest to the track, has a similar depth but covers a larger area of about 50 sq. metres.

Samples taken from outcrops of rock situated on the same contour line as Site



Plate 1. Howqua Quarry. Site one.

one and only 150 metres distant were examined by the Museum's mineralogist and classified as diorite. This is an igneous, plutonic rock which, because of its generally coarse grain size, fractures unevenly and would appear to be unsuitable for making stone axes.

Problems were encountered in accepting the sites as Aboriginal quarries. The following considerations caused some difficulty: — the scarcity of axe blanks with typical parabolic-shaped 'blades', the absence of rocky outcrops, the depressions on the sites, the tabular nature of the stone and accessibility to the sites.

Interest in the Howqua area was revived recently when a former local resident, Mr. K. Gibson, brought into the Museum in March this year, some fragmented pieces of stone from Site one which looked like axe blanks. During a visit to the area, only a few possible blanks were found, contrary to what might be expected from knowledge of the Mt. William and Berrambool quarries. Axe blanks can be difficult to

identify and most of those collected were in the "doubtful" category. However, later, after an examination of a large number of axe blanks, now in the possession of Mr. G. A. Crichton and taken from the two sites some years ago, it was apparent that the stones in the "doubtful" category were axe blanks. It is now known that the sites have been picked over a great deal by various collectors and as the two areas of fragmented stone are not extensive it is reasonable to postulate that over the years most of the best specimens have been removed.

Other Aboriginal quarries in Victoria are characterised by outcrops of stone but no such outcrops exist at the two Howqua sites. There are, however, the depressions referred to above. There is no evidence to suggest that these two quarry sites were worked by goldminers who operated in the Howqua area from the 1860's into the early twentieth century.

It is quite conceivable, however, that the Aborigines may actually have



Plate 2. Fragments of metabasalt. Site one.

quarried for stone at Howqua, in the true sense of the word 'quarry' and caused the depressions. On the other hand, if limited outcrops once existed, they may have been completely worked down below ground level by the Aborigines.

The tabular metabasalt in the two rock concentrations has something of the appearance of naturally fragmented stone. Much of the material at Mt. William, in contrast, has obviously been shaped and bears the marks of deliberate flaking. Only a small amount of the Howqua metabasalt fragments have these characteristics. In view of other evidence leading to the conclusion that Aboriginal man was responsible for the two heaps of fragmented stone, a reasonable explanation of the tabular appearance of the metabasalt is found in the nature of the material. Teale's description of the Howqua metabasalt emphasizes its 'platy' or closely jointed nature. When such stone is struck a blow, it tends to fragment into tabular

pieces along the jointing planes, in comparison with the Mt. William stone, which tends to break into more irregular fragments.

Teale's comment about 'platy diabase' being favoured by the Aborigines for the making of stone axes is somewhat dubious because of its closely jointed nature as mentioned above. For the Aborigines who made visits to the Howqua area, however, it was possibly the only source of reasonable axe-stone. Aborigines who made use of the quarries would almost have certainly come from the well-watered plains to the north and west of the Howqua valley. At the time of European settlement, this area was occupied by the Taungurong tribe. The distance involved for Aborigines travelling to the quarries would only have been in the vicinity of fifteen to twenty miles. Access would have been difficult due to the fairly rugged mountainous terrain of the area, and would possibly have been restricted to



Plate 3. A farm track exposing quarried stone. Site two.

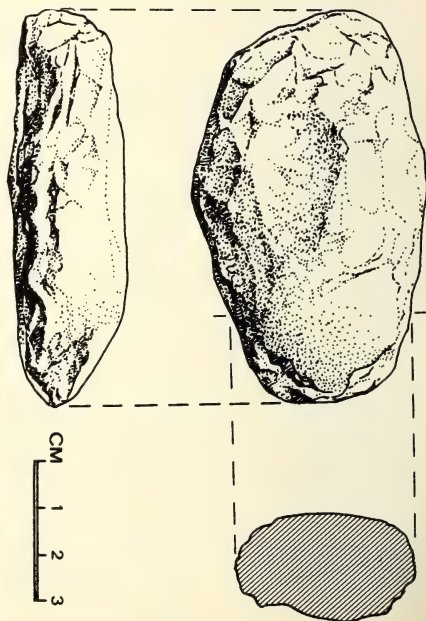


Figure 1. Ground-edged axe found in quarry fragments at Site one.

routes either along the river from the Jamieson direction or south along the ridges west of Mt. Buller.

The most important evidence confirming the use of the site by Aborigines is the implement found by Mr. G. A. Crichton (Fig. 1). This is a flaked ground-edged axe 8.5 x 5.2 x 2.5 cm and weighing 165.5 g. Bifacial grinding extends 2.5 cm from the cutting edge.

The blade is damaged and uneven and there is the possibility that the axe may have been used as a hammerstone. It was found beneath the surface of the stone fragments on Site one and may most reasonably be accounted for by the proposition that it was left behind by an Aboriginal quarry user. A thin section has been taken from this axe and from 27 other axes found at various places in North-Eastern Victoria for petrological analysis. This is being done as part of a wider study to trace the source and distribution of axe-stone used by Aborigines in the area now known as Victoria.

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Natural History Medallion Award

1974

Vincent Noel Serventy, B.Ed., Editor of "Australian Wildlife", and well known for his television series "Walkabout", has been awarded the Natural History Medallion for 1974. Formerly of Western Australia, he now resides at Hunters Hill, N.S.W.

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

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His Excellency the Honorable Sir HENRY WINNEKE, K.C.M.G., O.B.E., Q.C.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

Rates of Subscriptions for 1974.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 14 October — At National Herbarium, The Domain, South Yarra, commencing 8 p.m.

New Members —

Ordinary:

Mr. Max William Boyce, 1 Neera Court, Glen Waverley, 3150 (*Botany*)
Mr. A. Chmielski, 86 Grandview Grove, Rosanna, 3084
Mrs. Barbara Pleasance, Lot 73 Reserve Road, Nth. Warrandyte, 3113 (*General*)
Miss Josephine E. Scholtz, 6 Tiuna Grove, Elwood, 3184 (*Mammal & Field Survey, Botany*)
Miss Carolyn S. Philpot, 26 Prosper Parade, Burwood, 3125 (*Botany*)

Joint:

Mr. Michael D. Cusack, Mrs. Susan Cusack, 10 Haughton Parade, Rosanna, 3084.

Junior:

Ian Robson, 116 Victoria Road, Hawthorn, 3123.

Country:

Lynda Schaller Dye, 8 Dodgson St., Hopetoun, 3396
Mr. W. R. Archer, 11 Somers Ave., Mt. Martha, 3934 (*Mammal Survey*)

GROUP MEETINGS

Thursday, 17 October — Conservation Group meeting at the Herbarium. All future meetings will be held there, and **not** at Drummond St. Carlton.

Thursday, 24 October — Field Survey Group meeting in Conference Room, National Museum at 8.00 p.m. Specialist night: "Biological Illustration".

Saturday, 9 November — Geology Group. Meet at Royal Park Railway Station at 2 p.m. Geology of the Royal Park area.

F.N.C.V. EXCURSIONS

Thursday, 17 October — Rickett's Sanctuary, Mt. Dandenong. 10 a.m. Lilydale Train to Croydon Catch. Mt. Dandenong bus at station to Sanctuary. Meet 11.30 a.m. Entrance fee 40 cents. Bring lunch.

Saturday, 19 October-Sunday, 20 October — Bendigo-Maryborough weekend. See October Naturalist for details including meeting place for members wishing to join the party for Saturday only.

Tuesday, 5 November (Cup Day) — Mt. Blackwood. This is the President's Picnic excursion and will be held by Mr. P. Kelly and Mr. J. Myers on similar lines to the excursion last year and again we extend a welcome to all junior members to attend. Walks will be arranged including one into the Lerderberg gorge. The coach will leave Batman Avenue at 9 a.m. (note time) and a stop will be made at Bachus Marsh at 10 a.m. where members travelling by private cars can join the party. Coach fare \$2.50. Bring a picnic lunch and a snack for tea. Bookings for the coach should be made with Miss M. Allender, 19 Hawthorn Avenue, North Caulfield, 3161.

Sunday, 17 November — Labuertouche. Leader, Mr. J. Brooks of Warragul. Details next month.

December 26-January 3 — Falls Creek. Accommodation has been booked at the new motel at Falls Creek until Thursday, 2 January at a cost of \$14.50 per day, full board and this should be paid by members individually while the coach fare, including the dinner, bed and breakfast at the Alexandra Motel on the way back, totalling \$50, should be paid to the excursion secretary by 25 November.

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Front Cover:

Ibis Rookery, Coolart (see p 264)

Only two readers have replied to the editor in respect of the comment made in this column of the August issue, regarding the critical cost of printing the magazine.

Perhaps, in order for readers to evaluate the position more easily, the following two alternative statements should be made.

Either the magazine will be printed monthly with an increase in Ordinary Membership fee to \$14 p.a. or —

The magazine will be printed bi-monthly with an increase in Ordinary Membership to \$10.

Any comment should be sent either to the Hon. Secretary or Editor.

Following on the announcement last month in this column of the publication of the L.C.C.V. "East Gippsland Study Area" report, it is now appropriate to advise of the next and current release. This is the report on the "Mallee Study Area", which lies in the north-western corner of Victoria, and is bounded by the 26th parallel south, the Loddon River and the State borders with South Australia and NSW.

Written submissions as to how public land within this area may be used to better the needs of people should be lodged with the L.C.C.V. on or before 13 November 1974.

Victorian Ornithological Research Group

Westernport Report No. 1

Part 2

"The Birds of the Somers, Sandy Point, Hastings Districts, Westernport Bay" Victoria

by WILLIAM A. DAVIS
ALAN J. REID

Continued from Vol. 91, p 212

32. *Threskiornis molucca*, White Ibis

This species was the subject of a biological study at Coolart. Throughout the survey area it was very common resident found in habitats 1, 2, 3A, 5 and 6. Often flocks were observed crossing the main channel indicating interplay between Coolart, the Rhyll Swamp on Phillip Island and Little Heifer Swamp on French Island.

COOLART LAGOON

Mr. Luxton reported that White Ibis had frequented the lagoon in varying numbers ever since its completion in the late 1930's. During the drought year of 1958, when the lagoon dried out, several island were created. Over the next four years rapid regrowth of melaleuca etc. provided optimum conditions to promote breeding. This first occurred in 1961 with six nests. Conditions at Coolart are unique in as much as the high water level is controlled by a weir so as to allow about 6 inches to 1 foot of free board for the islands. These are never submerged so there is no risk of nests being washed out during exceptionally wet seasons. The winter rains fill the lagoon to capacity usually no later than early September. During spring and summer the water level slowly drops until by late summer it is usually 2 to 3 feet below the weir. This provided a relatively stable set of conditions and during the survey little variance was noted until the severe drought of 1967-1968. The birds were then forced to accept a much lower water level and bred in unprecedented numbers. As the Rhyll Swamp was dry, the Coolart population was obviously supplemented by breeding

birds from Phillip Island. Considerable mortality occurred at the end of the season when the lagoon dried out for the second time.

(1) *Population*

The population build-up at Coolart over the survey period is dramatically illustrated in figure 1. From 1969 to the present, the peak population has remained stable at about 1,200 White Ibis. This indicates the lagoon has reached its optimum carrying capacity.

(2) *Feeding*

A quite definite seasonal feeding pattern existed. This was established by the following procedure — firstly, general observations throughout the survey area and secondly, by noting the direction and size of returning flocks to roost at Coolart. Over 90 roosting counts were carried out. Each count was recorded on a compass dial type graph which indicated the total number of birds returning from each direction. Weather and tidal conditions were also noted. Figure 2 indicates typical results showing seasonal variations. During late winter, spring and early summer, feeding flocks were well spread over farmlands obviously due to an abundance of food.

During this period very few birds were seen on the tidal flats. As summer progressed and food became scarcer in the fields, more and more birds were noted on the tidal flats until, during late summer and autumn large numbers were seen. A corresponding decline occurred in feeding observations on the farmlands. Often the birds were seen feeding on the small soldier crabs which existed in tremendous numbers on the tidal flats.

(3) Roosting

Apart from noting size and direction of returning flocks, the time of arrival of each flock was recorded and graphed in an endeavour to detect any definite patterns. As before stated, these results confirmed feeding behaviour, but there appeared no obvious correlation between flock size and arrival time. During winter and early spring flocks tended to roost right on dusk. On long summer evenings, flocks often arrived before dusk and fed for up to one hour around the lagoon before roosting. Obviously during this period when the birds were feeding extensively on the tidal flats, the position of the tide influenced the time of return to Coolart.

(4) Breeding

Seven complete cycles were recorded from 1961 to 1967. The first six were very similar. In each case breeding was triggered by the lagoon reaching maximum capacity. This is illustrated in figure 3 which shows the relationship between rainfall, lagoon water level and commencing date of breeding. It also indicates the dramatic increase in nesting activity. The drought years of 1967-1968 were the first exception when the lagoon did not fill at all. The birds were forced to accept a much lower water level almost 2 ft. below the weir.

It appeared during August and early September that no breeding would occur. However, on 24 September, after 90 points of rain had fallen, breeding commenced. Two weeks later it became apparent a bumper season was pending. The birds colonised many new areas and the main and secondary rookeries carried record occupancies. Over 400 pairs nested. No further rain of any substance fell and by late November the water level was falling rapidly. As a result the first substantial mortality was noted, many late breeding birds deserting their young despite the fact

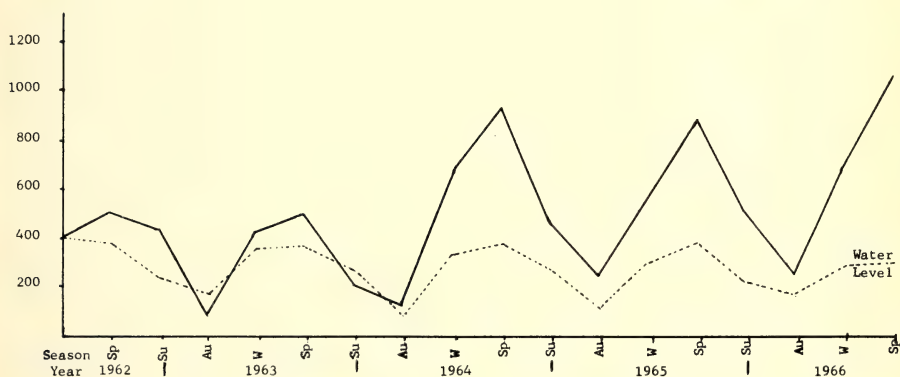


FIGURE 1. Coolart Lagoon. White Ibis.
Average roosting count per season.

that sufficient water remained to afford protection from land based predators. Mortality observations were carried out

at the end of each breeding season by inspecting the rookeries. Results are tabulated in figure 3.

Typical Breeding Cycle

Late June early July.	Build up in numbers noted. Birds commenced feeding in paddocks around the lagoon.
Mid-July.	Birds commenced roosting on rookeries.
Late July early August.	Lagoon fills. Birds carry nesting material. Reconstruct old nests, build new nests.
Mid-August.	Copulation often noted, usually on nest, male on top, flaps rapidly to maintain balance, bills entwined, mutual preening.
Mid to late August.	Laying commences.
Early September.	Hatching occurs, incubation period approximately 22 days.
September October.	Young develop. After approximately four to five weeks they move around the nest area.
Early November.	Young at flying stage, leave the nest area approximately eight to ten weeks after hatching.
November December.	Breeding activity tapers off.
January.	All breeding finished for the season.

During the study period no evidence of double brooding was noted. Colour banding would need to be employed to prove this, however no such banding is permitted at Coolart.

Changeover Pattern

Many were observed and during incubation and brooding, generally occurred as follows:—

Relieving bird arrives, stands on edge of nest. Birds engage in noisy entwining of bills with heads held high, then mutual preening. The sitting bird leaves the nest, flies to a branch usually close at hand, preens, attends to toilet, then flies away presumably to feed. Relieving bird moves on to nest, stands for one to two minutes sometimes giving a gentle shaking action to the nest, fluffs out feathers, then slowly squats to incubating position. On some occasions the relieving bird returned with nesting material which was presented to the sitting bird, who placed it in position around the nest before the actual changeover. There appeared no regular time period between changeovers during incubation, variations from 30 minutes

to three hours being recorded. After hatching, the parents returned at more frequent intervals for feeding and brooding. As the food requirements of the developing young increased, parents had a continual task returning at very frequent intervals, in some cases as short as five to ten minutes.

Polygamous behaviour was noted. On several occasions a male bird was seen mating with different incubating females.

During the 1964-1965 season an Albino young was reared to maturity. It lacked any black feathers and had pink eyes, bill and legs.

Since completing the systematic study in 1968, breeding activity has been relatively stable to the present time, between 350 and 450 nests each season: From our studies at Coolart the following conclusions can be drawn concerning water level:-

- (a) Given normal rainfall breeding commences when the lagoon is full.
- (b) Maintenance of the water level is essential during the breeding cycle.
- (c) A sudden lowering of the level will almost certainly lead to nest destruction even though suf-

- ficient water may remain to afford protection from foxes
- (d) Once the young birds reach flying stage water level ceases to be important.
- (e) Birds will accept lower levels under conditions of drought with great increase in mortality rate.

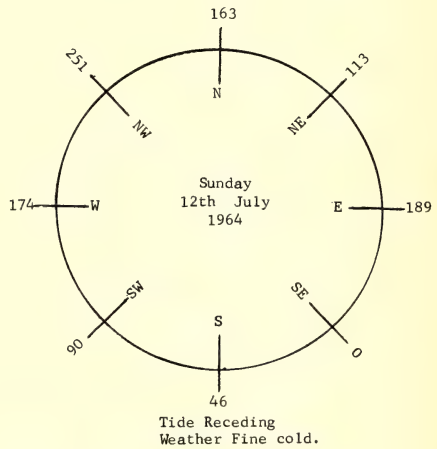
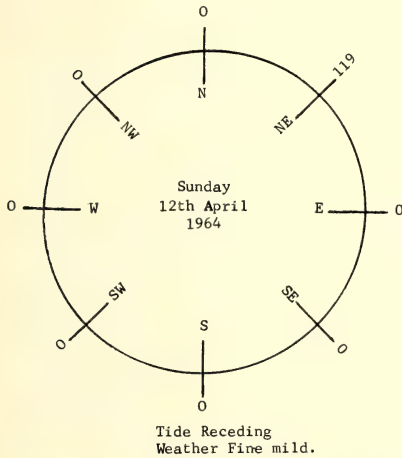


FIGURE 2. Typical seasonal variations in direction of returning Ibis flocks to Coolart. Note that N.E. is the direction of the mud flats.

Year	Rainfall (points)	Lagoon Full	Breeding commenced	No. of Nests	Mortality
1961	2754	Early Sept.	Mid Sept.	6	Nil
1962	3417	Early Sept.	20th Sept.	50	Nil
1963	3021	End July	4th Aug.	150	3
1964	4040	3rd week July	26th July	254	2
1965	2428	1st week Aug.	15th Aug.	210	Nil
1966	3922	Mid July	24th July	280	3
1967	1786	Drought year Lagoon did not fill	24th Sept.	420	50

Figure 3. Coolart Lagoon. White Ibis.
Summary of breeding results.

(5) Predation

Land predation was not a problem at Coolart. On only three occasions were dead adult Ibis found with heads bitten off, indicating possible predation by foxes. Remains of dead Ibis were found at other times, but we were not able to ascertain the cause of death. Foxes were often seen throughout the survey area. Mr. Luxton reported an occasional snake around the lagoon yet, during countless hours of filming from a hide for "The Coolart Story", absolutely no evidence of predation by snakes or water rats etc. was recorded.

Avian Predation

The lagoon was often visited by the Swamp Harrier, *Circus approximatus* and Australian Goshawk, *Accipiter fasciatus* but, here again, no predation was observed. The presence of these raptorial birds caused considerable noisy panic, adult Ibis often taking to the air, some non-flying young jumping to the water, others flattening themselves on the nests. This behaviour indicated that predation may have occurred on occasions during our absence.

A most interesting sequence of events involving a Peregrine Falcon, *Falco peregrinus* occurred. Extracts from our behaviour log provide a graphic description.

Sunday, 17 March 1963. On arriving at Coolart for the Ibis count, a Peregrine Falcon was flushed from the carcass of a freshly killed adult White Ibis. The falcon flew to a post apparently awaiting the returning flocks. He harassed each flock of Little Pied Cormorants, diving clean through the flock from a considerable height. On one occasion the entire flock of some 30 birds plunged headlong to the ground in an attempt to evade the falcon. It appeared the harassment was for sheer enjoyment as no attempt was made to make a killing. For the first time no Ibis returned to Coolart to roost.

Sunday, 24 March 1963. Peregrine Falcon still present. No Ibis returned

and considerably fewer Little Pied Cormorants. The falcon made no attempt to harass the flocks.

Sunday, 31 March 1963. Falcon still present. No Ibis roosted and few Cormorants. The following Sundays the falcon was absent and the Ibis and Cormorants gradually returned to normal numbers.

Population remained stable until Sunday 9 June 1963 when the count was down to only 20 Ibis and 57 Cormorants. The Peregrine Falcon was once again present. He stayed for two weeks. He was not seen again until 6.45 p.m. on Sunday 8 December 1963 when a falcon (possibly the same bird) completed several sweeps of the lagoon then perched on the same fence post. He made no attempt to harass the birds.

The Peregrine Falcon has not been recorded at Coolart since. It can be concluded the presence of the falcon caused such fear in the Ibis that they roosted elsewhere.

Obviously Coolart is a vital link in the chain of Ibis roosting and breeding areas in the Westernport area. It is a viable conservation unit of untold benefit to the farmers of the Mornington Peninsula. Its value as an education area cannot be over-emphasised. Its close proximity to the children's education camp provides nature study lessons for thousands of children from all over Victoria each year. The potential for further biological studies on a great variety of waterfowl species is tremendous when one considers the relatively stable conditions existing. Also the fact that water level could be manipulated manually to ascertain optimum conditions to promote breeding. The Coolart property would make a unique environmental studies centre. Its preservation is a matter of utmost importance. Further industrial and urban pressures in the Westernport region will place the future of Coolart and indeed of many other natural areas in great jeopardy.

33. *Threskiornis spinicollis*, Straw-necked Ibis

First occurred during May 1961, ten birds noted at Coolart. They stayed until early August. In 1962 during September, 20 birds seen. Twelve months later in 1963, 53 birds appeared. A further increase in 1964 when 80 straw-necks frequented the lagoon June to September. Exactly the same period 1965 numbers reached a peak of over 100. It was hoped the species would breed but each year they dispersed during September to return in May or June the following year. It has remained to this day a mystery as to why the straw-necked Ibis will not breed at Coolart in spite of the fact that excellent low scrubbed islands exist that the White Ibis will not use. The species was never recorded on the tidal flats. Often they joined the Whites in the paddocks to feed. H.5,6.

34. *Platalea regia*, Royal Spoonbill

These magnificent birds made their first appearance at Coolart on 18 November 1962, when three birds stayed two months. During this period 10 to 20 consistently noted from Hanns Inlet. In August 1963, six took up residence at Coolart. By 20 October were present. It was a high point of the survey when during mid-October 1963, two nests with freshly hatched young were discovered. During later months four further nests found. Birds stayed until March 1964 then left to return again in increased numbers during July. Six pairs again nested commencing in November and concluding January 1965. 20 birds were permanent residents during that year until September when numbers swelled to over 100. Again six pairs bred. This pattern was almost exactly repeated during 1966 and 1967. During the drought the Coolart population was supplemented by an influx of birds probably from Phillip Island as the Rhyll Swamp was dry. Over 200 birds were counted including several banded birds. However only six pairs appeared to nest.

It was noted that the Spoonbills nest consistently later than the Ibis. Often they used old Ibis nests. They generally started during November and nested through to January and February. The receding water level seemed to affect them less than the Ibis. Often their mating displays were observed, their majestic breeding plumes being used to advantage. Like the Ibis they engage in bill entwining and mutual preening. They are far more aggressive during mating and breeding than the Ibis. The species was frequently seen along Hanns Inlet and the fresh water swamp. Records exist for all months of the year. H.2, 3a, 5.

35. *Platalea flavipes*, Yellow-billed Spoonbill

Occasional records. Single bird at Coolart 24 March 1963. Single records June, July 1964, three September that year. February and May 1965 single records for Hanns Inlet. March 1966, ten birds spent a week at Coolart, H.2, 3a, 5.

To be continued.

Field Naturalists Club of Victoria

Notice to Contributors

Contributions should preferably be typed on quarto or foolscap sheets, double spaced, and with 1½" left hand margin. Any dates should be shown with the day preceeding the month — e.g. 25 October . . .

Nats on the Buffalo

by

MAX W. BOYCE

It is one hundred and fifty years since Mount Buffalo was first reported and named by white man. On 25 November, 1824 Hune and Hovell, on their epic journey south to the Port Phillip District, saw the mountain in the distance to the south-east and named it, presumably for its shape.

Probably the first person to explore the mountain was that great botanist, and one time patron of the F.N.C.V., Baron von Mueller. Accompanied by John Dallachy, Superintendent of the Melbourne Gardens, he travelled the Buffalo Ranges in early 1853 on a collective expedition. He was the first to ascend Mount Aberdeen (now known as the Horn). Willis (1949) suggests that Mueller was responsible for naming it Mount Aberdeen, but it appears that the name was shown on maps prepared by Major Mitchell following his 1836 expedition.

The F.N.C.V. was founded in 1880, and the first issue of its journal, *The Victorian Naturalist*, appeared three years later. Some of the articles in early volumes of the journal are of interest in that they show the effort required to reach the Buffalo in those days. Amongst the earliest references is that of Charles Walter (1899). Having caught the 5 a.m. train from Bright to Porepunkah, he followed the track to Manfield's Buffalo Fall's Temperance Hotel and thence to the Eurobin Falls, arriving in time for breakfast. The next day, accompanied by one of Manfield's sons, he made the ascent. The climbing commenced soon after leaving the banks of the Eurobin, "... the spur being of so steep a gradient that for over a mile the track is in a continuous zig-zag, each part from 10 to 30 yards long to the next turn." After much more climbing, still scrambling through between piles of rocks, they eventually reached the plateau.

Barnard and Sutton (1903) report a visit to the mountain the company of Mr G. Weindorfer (later of Waldheim — Cradle Mountain fame). The route they took for the ascent, known as Staker's Track, had been constructed for the Bright Alpine Club and named after its first president. The track commenced opposite Manfield's Hotel and approximated the route taken by the present road. Barnard and Sutton were so enthralled by their visit that they suggested the F.N.C.V. should hold one of its periodical excursions there.

As a result of this suggestion, the first F.N.C.V. "Camp-out" on the Buffalo was held from 24 December, 1903 to 4 January, 1904. The party of 24, having as their leaders Messrs G. Coghill and G. Weindorfer, arrived at Porepunkah by rail from Wangaratta in a covered truck which had proved to be "rather dirty and decidedly rough." They were then conveyed in an imposing array of traps to "Ernani", the home of James Manfield (Jnr), at the foot of the mountain, where 20 of them were accommodated for the night, the gentlemen sleeping in the barn on improvised beds of wire netting stretched over logs. Climbing the mountain on Christmas Day they set up camp within fifty feet of the Gorge. The camp consisted of a slab hut in which seven ladies slept (probably the Alpine Lodge belonging to Manfield), a canvas tent-house for eight men, a dining tent, two bell tents and two small tents — "a really imposing settlement, excellent in fine weather, but somewhat leaky, excepting the bell tents, in wet weather." (Unfortunately they had an abundance of wet weather.) As in the barn in the valley below, they slept on beds of wire netting stretched between logs.

Attitudes change over the years. Hodgson (1927) mentions, without a hint

of reproach, that on his recent visit to the mountain he had discovered just behind Bent's Look-out an interesting record of the 1903-04 Camp-out — "a well blazed Eucalypt with the names . . . and the date '1903' deeply scored thereon, and quite clear, except that the encroaching bark is gradually closing over the edges of the old wound . . ." One cannot imagine this being one of the accepted activities of club members today.

Invariably the early field naturalists on the mountain appear to have been enthralled by the plant life they found, and in particular by the number of plants they found in bloom in the summer months.

Of the 445 species of vascular flora that have been recorded on the Buffalo, three are endemic, viz. the Buffalo Sallow wattle (*Acacia phlebophylla*), Fern leaf Baeckea (*Baeckea crenatifolia*) and Buffalo Sallee (*Eucalyptus mitchelliana*). *Baeckea crenatifolia* is the rarest of these. Although its present distribution is not known (Rowe, 1970), it was reported both by Walter (1899), who saw it in full bloom on the banks of Eurobin Creek, and also by Barnard and Sutton who reported "Making Manfield's Temperance Hotel, within sound of the Eurobin Creek, our headquarters, we were soon enjoying a dip in the clear stream, and admiring the bushes of *Baeckea crenatifolia* F v.M., covered with sprays of beautiful white flowers, along the banks of the creek.

The Blotchy Mint Bush (*Prostanthera walteri*) is a shrub that seems to have always excited the interest of early visitors. Found first by Walter on Mount Ellery, Croajingalong, in East Gippsland in December 1869, and named after him by Mueller, it was recorded first on the Buffalo by Barnard and Sutton.

Interestingly, although Walter was on the mountain some years previously, he does not appear to have found it there. The members of the 1903-04 party found the plant growing "in great profusion" near the Gorge in the locality where Barnard and Sutton had recorded their

find in the previous year. No other plants had been discovered elsewhere, but by 1939 Stewart was able to record it along the road to Lake Catani, at the Horn and on the eastern slopes of Mount Macleod.

Although *P. walteri* is relatively rare in its distribution, being restricted to Mount Buffalo, W Tree, Mount Kaye, Mount Ellery and nearby N.S.W., and although Stewart (1939) wrote that "... the plant cannot thrive away from its natural setting of tumbled granite boulders", it is now reasonably common in the suburban gardens of native plant enthusiasts who have found it to be an easy grower for rockeries (See Macdonald, 1971).

Finally, the beautiful Royal Grevillea (*Grevillia victoriae*) discovered and named by von Mueller in honour of Queen Victoria during his 1853 visit, is another plant which seems to thrill visitors. Writing of a visit in the Alps district in 1887, Walter commented "I never can forget my delight when I saw the first tree of *Grevillia victoriae* covered with one mass of bright crimson flowers, and I am sure the Baron must have experienced the same when he named the plant in honour of Her Majesty."

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The Pollination of *Acianthus caudatus* R.Br.

by DAVID L. JONES

The pollination of *Acianthus caudatus* R.Br. provides another fascinating link in the ecology of Australian orchids. Unlike many of our species, if the weather conditions are favourable, the process occurs quite actively and can be readily observed. My wife and I have watched the pollination on several occasions in our bushhouse at Bayswater, and this paper is based on notes made during these times.

For those who are not familiar with the features of *Acianthus caudatus*, it has been well delineated by Nicholls in Australian Orchids (complete edn) Pl. 191 (1969). Fig (a) of the accompanying drawing gives a general idea of its habit.

Briefly it is a diminutive orchid forming loose colonies in open forest country of N.S.W., Vic., Tas., and S.A. Generally few members of the colonies flower but massed flowering may occur in good seasons, or following the stimulation of bushfires. Its flowering period is spring, and the flowers are a dark red-black. This colouring combined with the filamentous nature of the perianth segments and the gloomy habitat renders these orchids very inconspicuous.

The species advertizes itself to pollinators by a scent which diffuses readily into the air and provides quite a remarkable attraction to microdipterous insects. These may be found on the flowers at any time, but become more active and abundant during conditions which favour release of the scent. On warm days they can be observed quite readily. The approach to the flowers is always the same, with the insects flying into the wind as if they are following a perfume trail. The attraction must be very strong, for on windy days, sudden

gusts may carry the insects backwards and the flowers may not be reached for several minutes; but they still persist. Once on the inflorescence, they scramble actively around until a suitable flower is found on which to feed.

Several species of insect, all Dipterans, have been observed to feed on the flowers, but of these only three are large enough to affect pollination. Of the three, only one has been found consistently bearing pollinaria. This species behaves very purposefully and seems to be the major pollinating agent. It is illustrated in the accompanying drawing. The other two insect species have not been illustrated. Although they may occasionally pick up pollinaria, their role seems relatively minor in the overall pollination ecology of *Acianthus caudatus*.

The pollinating agent illustrated has been identified by Dr. D.H. Colless of CSIRO, as a female of the *Mycoma* genus, family Mycetophilidae. Unfortunately insufficient is known about these insects to take identification further. The two other larger visitors were also identified. These were females of *Sylvicola dubius* Macq. family Anisopodidae and a Female *Sciara* sens. lat., family Sciaridae. Several specimens of each were collected.

The scent of *Acianthus caudatus* is quite obnoxious, and is very noticeable when a group of flowers is examined on a warm day. The smell resembles something dead, and there is no doubt about the effectiveness of its attraction. It is detectable under any conditions, but becomes particularly strong during humid weather or with a rise in temperature up to about 18 deg. c. On showery Spring days it is still quite

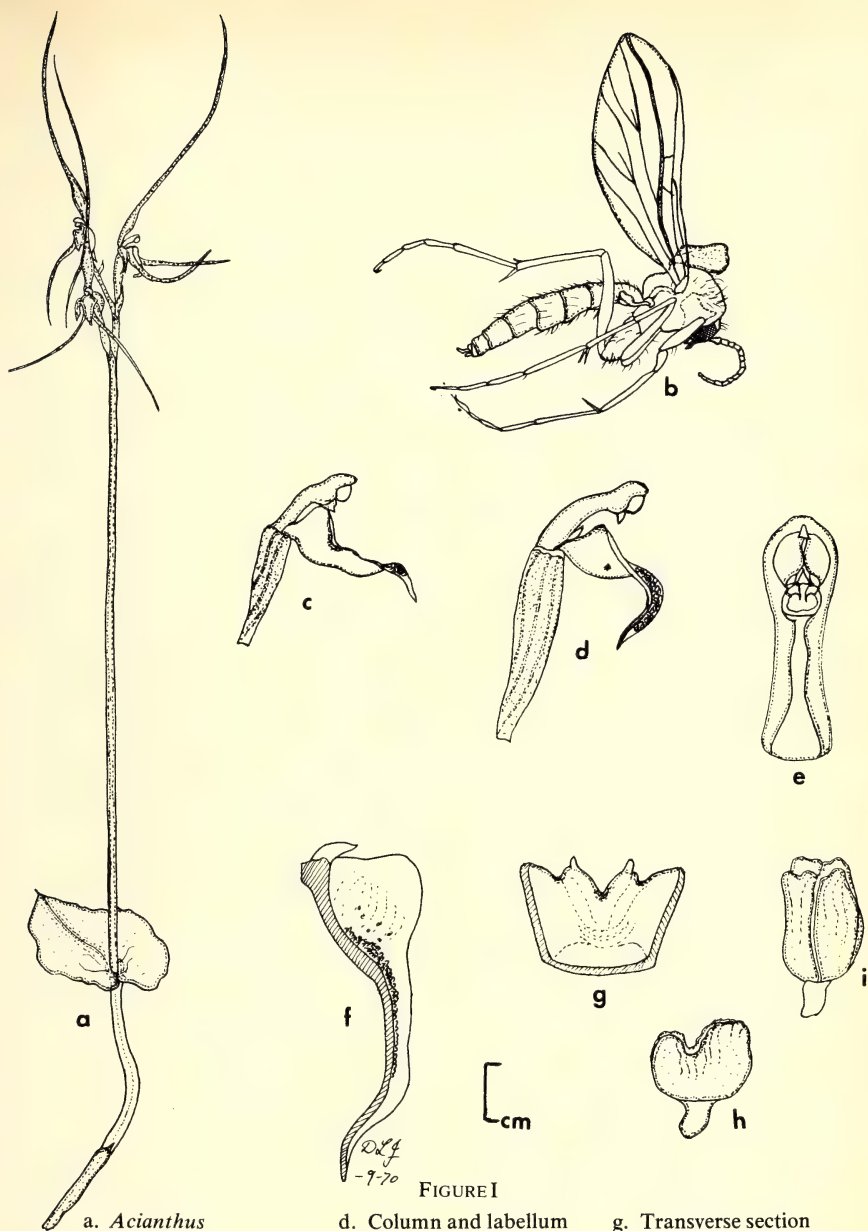


FIGURE I

a. *Acianthus caudatus*
(Indicated Scale)

b. *Mycoma* sp. (10xI.S.)

c. Column and labellum
from side of a young
flower. (5xI.S.)

d. Column and labellum
from side of a mature
flower. (5xI.S.)

e. Column from front.
(10xI.S.)

f. Longitudinal section of
labellum. (10xI.S.)

g. Transverse section
through base of labe-
llum. (10xI.S.)

h. Pollinarium from side.
(20xI.S.)

i. Pollinarium from end.
(25xI.S.)

obvious, seemingly becoming stronger just before the rain. It can also be detected quite late into the evenings following mild days when insect activity can be observed, but to a lesser extent.

A study of the flowers of *Acianthus caudatus* reveals the mechanisms adopted by the species to ensure pollination. As is usual with orchids the labellum plays the major role. In the young flower the relative positions of the column and labellum prevent the withdrawal of the pollinia. The flower takes about two days after opening before it is mature enough for pollination. The changes during this period involve arching of the column so that the rostellum comes into a position where it can be brushed by a visiting insect; and a downward movement of the whole labellum so that the gap between the column and labellum becomes sufficiently large to admit the pollinating agent. Coinciding with this downward movement is a change in labellum shape. The upper third becomes recurved and the margins rolled under. The overall result is that a small basin is formed at the base of the labellum. These changes are shown in the accompanying illustration.

The importance of the relative movements of the column and labellum will be shown later when we consider the actions of the pollinating insect, however the importance of the change in shape of the labellum is immediately obvious. The basin formed is for the collection of droplets of nectar. This is secreted by two small, erect glands situated on the upper posterior margin of the labellum. In the young flower these are hidden, but become exposed by the downward movement of the labellum as the flower matures. The nectar streams from the glands and collects into small droplets in the basin. It is prevented from running further by a mass of minute calli sited on the anterior edge of the basin.

The nectar apparently proves very delectable to the visiting insects because it is avidly sought by them. By studying

the insects behaviour it can be seen that the nectar plays two important roles. Firstly it brings the insect into line with the column. After landing on the raceme the insect moves across to a labellum and then upwards probing as it goes, until it finds the pool of nectar. Here it feeds on the nectar in the same manner as a mosquito drawing in blood. This involves an upward movement of the insects body each time it draws in some nectar. It is during this upward movement that the insects thorax contacts the rostellum and the pollinia are withdrawn. Here the second function of the nectar becomes apparent for it stupefies the insect. This intoxication only lasts for a short period but is sufficient time to allow the glue of the rostellum to cement the pollinarium firmly to the insect.

The pollinarium of *Acianthus caudatus* is divided into two equal halves. Each consists of two pollinia attached directly to a viscidium, thereby giving the orchid two chances to secure successful pollination from each other. On a few occasions insects have been observed to pick up both parts at once.

The removal of pollinaria and the deposition of pollinia on the stigma are both facilitated by exertion of the organs involved. The column is curved over the labellum with the anther and stigma situated at the apex. The triangular viscidia jut out on the rostellum above the stigma and are easily picked up by the insect brushing against them. The stigma also protrudes at an angle that facilitates deposition of the pollinia. As there is no caudicle involved there is no subsequent movement of the pollinarium on the insect, hence these adaptations ensure maximum efficiency of the pollination process. That they are successful is illustrated by the large number of swollen ovaries one sees on this species late in the season.

The author wishes to thank Dr. D.H. Colless, Curator of Diptera, CSIRO, for identification and notes on the insects.

A Versatile, Personal Literature Index

by GEORGE ETTERSHANK*

Abstract

A simple, rapid method for indexing, cross-referencing and retrieving references to reprints and other scientific literature is described.

Mannetje (1972) recently described an excellent personal literature index system, based on edge punched cards, which was readily adaptable for computer sorting. He noted the disadvantages associated with systems based on plain cards, in that an extensive cross index is usually required — this involves duplication of cards several times over. Such a system becomes bulky, cumbersome and tedious to maintain and search.

In Mannetje's system, edge punches are used to index the first author's initial and up to 70 categories. Multiple punching for single categories is discussed and rejected. There are, however, two failings of the system, applicable to all edge punch systems seen by the present author, that Mannetje does not mention:

i. Whether single or multiple punches for each category are used, whether the categories are unique or hierarchical, the research worker must have a very clear idea of exactly what categories he wants before he punches the first card; as a corollary to this,

ii. Once launched, the system is virtually immutable, because edge punches cannot be restored (except with flimsy and impractical paper tabs). Cards with punching errors (for whatever cause) must be retyped.

The established worker can probably define his sorting categories confidently

when he embarks on an edge punch system, provided (in fact, or by artificial lumping) the number of categories is reasonable in size — 70 in Mannetje's system. For students starting to work in a new field, this is simply impossible.

After a couple of abortive attempts (including one simple and one complex edge punch system), the present author has devised an index system (based in part on a simple one used by his colleague, Dr. J. Nelson), that overcomes these difficulties. It contains a simple but efficient cross-index, is easily maintained, references reprints as well as literature citations, and is cheap and compact.

The main component of the system is the author cards, one only for each author or co-author. These carry the data for each publication, typed near the top of a plain, 127 x 76 mm (5 x 3 inch) index card, using the usual form adopted for journals — further notes may be placed on the lower half of the card — thus:

342

Brown, W.L. 1968. An hypothesis concerning the functions of the metapleural gland in ants.

Am. Nat. 102: 188-191.

A single serial number is then given to this (and any co-author) cards, and also to the corresponding reprint if it is in the user's collection — in this case, the serial number is 342.

As a batch of cards is completed, the cards are photocopied using a special holder. This is made of heavy paper folded to form a series of parallel

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pockets and reinforced with tape; it holds seven cards, one above the other, which are then copied onto quarto paper. These sheets are assembled in a stout binder to form a shelf list.

The principal author cards are then taken singly, and the number only is noted onto cross-reference cards, after which the author cards are filed alphabetically.

The cross reference cards comprise two, alphabetically ordered series — a subject index and a taxonomic index. By use of cards with flags, categories that are referred to frequently are easily found. The greatest reduction of effort may be achieved, however, by intelligent use of subcategories. Thus a series of cards may be:

HARVESTER ANTS — Ecology
HARVESTER ANTS — Food
Preferences
HARVESTER ANTS — Nest
Structure
HARVESTER ANTS — Physiology
HARVESTER ANTS — Taxonomy

While categories and subcategories should, preferably, be unique, the same reference number may appear on more than one card, either because of overlap in categories, or because one paper covers more than one topic.

In practice, the author and cross reference indexes may be used in a number of ways.

1. Simply as an index to the reprint collection, in which reprints are stored serially, in filing cabinets or boxes.
2. To obtain only those titles relevant to a particular subject — the appropriate numerical entries in the shelf list are consulted, after obtaining the numbers from the card(s).
3. To obtain specific references — for example, titles on the **ecology** of one particular species of **harvester ant**, *Pogonomyrmex rugosus*. Obtain the

numbers in common on the two cards "HARVESTER ANTS — Ecology" and, from the taxonomic index, "*Pogonomyrmex rugosus*". As the numbers on the cards are in sequence, this is quickly done.

4. To construct quick bibliographies, either to send to colleagues or for the draft of papers — withdraw the appropriate author cards, assemble them in sequence in the holder mentioned above, and photocopy them.

Discussion

This system has the following advantages:

1. It may be used from the outset of a student's career in his chosen field.
2. It indexes and cross-references both reprints and literature citations.
3. Categories are open-ended — they may be changed, lumped or sub-divided at any time, or new categories added as ones interests broaden, with a minimum of effort.
4. Quite sophisticated literature searches may be easily done.

Initially, there may seem to be a disadvantage in not having ones reprints stored by authors. This turns out to be more of a traditional carryover, and in fact individual reprints can be found more quickly by this method as they are filed systematically rather than under a category such as an author or in a box marked "B", etc.

One point that should be remembered with all cross-index systems is that category names sometimes have synonyms — thus a paper on venoms could be indexed under VENOMS, TOXINS or POISONS.

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Spring Collecting in Central Queensland

by J. C. LE SOUEF

In recent years I have written some notes on winter insect collecting in northern Australia, this being the only time available to take extended trips. As my wife and I had not been to Queensland in early Spring we decided on a shorter visit than usual, as far as Rockhampton, in September 1973.

Normally this is a little early for coastal insects as they do not appear in numbers until November. On this occasion, the main object of our journey was to see some of the southern butterflies in a new locality west of Rockhampton recently found by Mr. Andrew Atkins of Rockhampton.

As we were a few days earlier than expected, because of inland rain closing some roads, we decided to spend a few days at Yeppoon. Always a mecca for entomologists, we could not resist the opportunity of again visiting this delightful spot.

With a sea breeze the weather was mild, with cool evenings, although the sun was hot enough in sheltered places. We stayed at the nearby Emu Park Caravan Park among the foreshore greenery of sub-tropical vegetation.

At Yeppoon the main area of interest was the Close Vallis Reserve overlooking the town. With its wide variety of fauna, it is a fitting memorial to this widely known naturalist who spent his life in the Rockhampton district.

Making our way up the rough and steep track to the southern end of the Reserve, we were treated to an unexpected variety of butterflies and other insects. This is a perfect collecting spot, with masses of lantana and a backdrop of the deep blue waters of Keppel Bay. There were many of the

larger swallowtails and whites as well as smaller whites and blues, feeding and flitting about with a constant kaliedoscope of movement. We tallied 34 species here. Although mostly common and widespread, some were in unusual numbers for this time of the year. In this category were the Skipper, (*Toxidea peron*), the Blue Triangle Swallowtails, (*Graphium sarpedon choredon*), (*G. eurypylus lycaon* Westw.), the Orchard Swallowtail (*P. aegeus egeus*) and the Lycaenid (*Candalides absimilis* Feld.). The unusually wet winter had apparently brought out many species earlier than normal.

The high scrub with which the reserve is covered is difficult to negotiate, with the many woody vines and sharp scratchy shrubs over a ground surface of loose rocks.

In the small open spaces along wallaby pads, we had the pleasure of seeing for the first time two of the gems of the butterfly world. Here we found the Fourbar Swordtail (*G. leosthenes leosthenes*) and the Cornelian (*Deudorix epijarbas diovis* Hew.), probably the world's most ancient swallowtail, it was indeed a delight to watch them flying about apparently very conscious of the tails trailing behind them, so different in flight from the larger Blue Traingles feeding on the lantana out in the open. High on a leaf tip on one of the trees we were intrigued by a small butterfly darting at any other insect that appeared. There was a brilliant red spot on the upper side of the wings glinting in the sunlight as they were opened and closed. This was the Cornelian, a Lycaenid butterfly well known along the coast, the larvae of which feed in the

yellow fruits of Tulipwood (*Herpullia pendula*).

There were many birds about in the scrub including Scrub Turkeys with a large mound nearby. People living in the vicinity of the Reserve have trouble in keeping cage birds because of the depredations of small snakes which abound there, but we only saw two goannas on this occasion. We did not find any of the larger ground spiders or scorpions among the rocks although there were several tarantulas (*Isopeda* sp.) with egg sacs on the under sides of larger rocks.

On an aboriginal campsite at Emu Park, I was interested to find pieces of very soft local mudstone used as crude implements. Among some 50 of these were two discoidal scrapers, one of schist and one of quartz. These latter were referred to Dr. Norman B. Tindale then in Canberra. He was interested to observe that this was the first record of their being found east of the Dividing Range.

While the time spent here at Yeppoon was a highlight of many years of collecting, it was a visit to the Expedition Range 160 km west of Rockhampton that was the main object of this trip.

On Friday, 21 September, 23 left Emu Park for Rockhampton and Expedition Range. A call at the beautiful Rockhampton Gardens on the way provided an example of the great fluctuations there are in insect emergences. In July 1962 there were hundreds of butterflies on the wing of a number of species when we had lunch there. Ray and Nola Manskie recorded many species too, in May of last year. This time we made straight for the big patch of buddleia, the focal point of collecting in the gardens only to find the clump had gone and the ground bare with scarcely a dozen butterflies to be seen anywhere.

Not far out on the Capricorn Highway, Andrew Atkins had found a small flat topped hill which was the playground of

a number of species of butterflies. We were rewarded from toiling up the steep slopes by finding a number of butterflies playing about in the sun on the top. While we, in Victoria, have looked for some butterflies on hilltops in the hills and the Grampians, in New South Wales and Queensland, many species are to be found in this way.

Having spent some time as a jackeroo in 1928 on the cattle station, Coomooboolaroo near Duaringa, the home of the Barnard family of naturalists, it was a pleasure to again visit this part of Queensland and recall some of the experiences of younger days.

Expedition Range was first mentioned in Natural History literature by A.S. Meek in "A Naturalist in Cannibal Land", when he and G. Barnard made a packhorse trip there in 1890 from Coomooboolaroo. Nothing more of "The Range", as it was locally known, until in 1969 Andrew was struck by its likeness to the Grampians when flying over it on a TV assignment. A year or so later a road was built so that the timber resources of the Blackdown Plateau of the Expedition Range could be exploited. With a means of access he was able to satisfy his curiosity as to the butterfly fauna to be found there. His hunch paid off, with a list of 97 species being recorded since his first trip to the plateau.

Mr. Ernest Adams of "Mourangie", Edungalba, the central Queensland coleopterist whose cattle property is within sight of "The Range" has also recorded a number of species of beetles from this area.

Botanists will be very interested in the results of the Canberra CSIRO list of flora taken there recently.

We set up camp near the edge of the escarpment in a picnic area set aside by the Forest Department under the giant Blackdown stringy-bark and Angophoras. Of the many camping spots we have had in various parts of Australia, this was one of the most

satisfying, with its view to infinity to the north.

On Saturday morning we could see a cloud of dust away down on the plain below which soon materialised into Andrew's vehicle. He was coming up to join us at our cup of morning coffee. Shortly afterwards we were also joined by Ernest Adams with a party on a log rolling expedition searching for ground beetles.

With so many southern plants and shrubs about, it was difficult to realise that this was central Queensland. While some time was spent on Andrew's original collecting area along the escarpment, it was found that the concentration of insects on this occasion was on a patch of teatree in a shallow gully not far from the picnic area. As the flowering shrubs were only 1m high, collecting was a simple matter. Here in a couple of hectares were dozens of butterflies, wasps, flies, moths and beetles. It was, indeed, one of the collecting spots a southern entomologist dreams about, but very rarely sees. Not only was there a great variety of insects about but there was the added zest that here too, were species as yet not scientifically described. This in itself was a surely a very rare treat for the most blasé entomologist.

Apart from 18 species of Skippers, there were many other butterflies common to the north. Of the moths were the clicking Ggaristid, *Idalima tetrapleura* (Meyr.) and the bustling Clear-wing Hawk Moth, *Cephonodes hylas* L. There were three species of small Stigmodera and one Melobasis among the beetles; and many hover flies and other insects.

The Blackdown Plateau is a fascinating place for the naturalist with such a variety of flora and spectacular views over the surrounding country. Heavily timbered with big Eucalypts and Angophoras there is a ground flora of many flowering shrubs and plants. There are waterfalls and high and low rock

pools with their associated flora and fauna.

As one would expect, this country is subject to bush fires. Andrew took John Landy to see the results of a fierce fire which devastated the country in 1971. They expected a great depletion in the insect fauna but despite the damage, the flora has quickly regenerated and there is now little evidence of the conflagration.

Even in the short time the plateau has been accessible, the vandal has been busy defacing aboriginal paintings to be found there. If only for this reason, we must be thankful that the Forest Department now insists that permission must be sought before entering the reserve. Application must be made to the Forest Dept. (Rockhampton) Forester, P.O. Box 344, Rockhampton, Qld, 4700. It is hoped that a fifty square mile National Park will shortly be declared.

Because of the success of the trip, we decided to return home a week earlier than planned, three weeks instead of four. We leisurely packed up and made our way down the road towards the lowlands, collecting along the roadside as we went. Further down the road, we were reminded of the stamina of the keen naturalist. We had heard from the policeman in charge of the Timber Creek station in Northern Territory of his worry about the party of elderly enthusiasts from our Club, toiling up the steep and stony gully in the heat to the rock paintings on the escarpment above. We had also heard from Ernest Adams, of his taking his lunch up a large gum at Cooktown in a determined effort to capture the rare jewel beetle *Calodema regalis*. And here again was another example as we met Andrew on the road coming up the escarpment at 9.15 in the morning, having driven the 160 km from Rockhampton for an hour's collecting before returning to start his day's tasks at 2 p.m.!

On the way towards the Newell Highway, we stopped at the Isla Gorge

Lookout near Taroom. This provided another spot for hilltopping, with a number of species of butterflies flying round the crest of the ridge. Among them was the newly described *Proeidosia polysema*, one of Andrew's localities for this small skipper which he has just described in the J. Aust. ent. Soc.

We had been looking forward for years to be in the Pilliga Scrub in the spring with its variety of flora. However we were not prepared for the many square miles of gums, mallee and shrubs in full flower. The air was alive with the hum of insects with a number of apiarists making good use of the honey flow.

With so much flower about, there was little hope of doing much insect

collecting with the short time at our disposal. We made our way to the only eminence in the area, Salt Caves, visited earlier by our President, Mr. Peter Kelly. Apart from one Tailed Emperor (*Polyura P. sempronius* Fab.) a couple of common white butterflies and some small blues, the only thing of interest was a large Jewel Beetle which had for some reason decided to settle on the top of the rocky hill. A little further along the road, a check was made for *Ogyris barnardi*, taken earlier in the year, and the skipper *Herperilla donnysa* sp, but it was a little late for either of them.

We returned with some 800 specimens, many of which were of particular interest in the distribution of their particular group.

He Seeks to Snap a Rare Wren

Australian photographer, Mr. A. G. Wells, of Perth, is to make a visit to a remote corner of the Kimberleys in search of the rare black-grass-wren.

The wren is known to live only in the almost inaccessible Prince Rupert River of the north-west Kimberleys. Mr. Wells will be taken in by helicopter and there join a scientific survey group at present operating in the area.

It has only rarely been reported by ornithologists, and has never yet been photographed.

Mr. Wells is making his trip under a special grants scheme sponsored by the Bank of New South Wales over a period of four years for the National Photographic Index of Australian Birds.

To make his safari to photograph the rare bird possible Mr. Wells has been

granted \$300 cash, and provided with \$90 worth of film, and the loan of special camera equipment valued at more than \$2,000.

Last year Mr. Wells visited Dirk Hartog Island on another rare bird expedition. He found and photographed the black-and-white wren, which lives only on the island.

The shots he took of this bird are now in the National Photographic Index.

Other grants from this year's allocation of funds for the project are now being considered, and will be announced soon.

The project aims eventually to establish a comprehensive national reference collection of outstanding colour photographs of Australia's 700 (approx.) species of native birds.

The Origin of Generic Names of the Victorian Flora

Part 2 — Latin, Greek and Miscellaneous

(continued from 91(8))

by JAMES A. BAINES.

Ceratogyne. Gk *keras*, keratos, a horn; *gyne*, a pistil (female part of flower, see reference to *Myriogyne* under *Centipeda* above). *C. obionoides* has horn-like appendages on the achene, hence its common name, Wingwort. The genus was founded in 1851 by Turczaninow for this species, which is the only species in this solely Australian genus. He bestowed the specific name because it reminded him of *Obione*, a genus founded by Gaertner from a specimen originating from the Obi River in Siberia (now the Ob). *Obione* is in family Chenopodiaceae, whereas *Ceratogyne* is in Compositae.

Ceratophyllum. Gk *keratos*, horn; *phyllon*, leaf; despite this derivation, it is the fruit (a nut) that is horny, hence the common name, Hornwort, for our species, *C. demersum*, which is a cosmopolitan plant that grows rootless and submerged in shallow stagnant or slow-moving waters. Lat *demersum* means submerged. Fish fanciers use in their aquaria plants of *Ceratophyllum*, which gives its name to the family Ceratophyllaceae.

***Cestrum.** Gk *kestron*, name of a different plant, thought to be Betony (*Betonica officinalis*), the name being put in Latin form. **C. parqui* is Green Poisonberry, and is found in the N and R grids in Victoria. A now invalid genus, *Parqui*, set up by Adanson for a species of *Cestrum*, is the origin of the specific name.

***Chamaecytisus.** Gk *khamai*, dwarf; *kytisos*, used by the Greeks for several kinds of woody legumes. **C. prolif-*

erus is Tree Lucerne or Tagasaste, known to many as Lucerne Tree. It was described as *Cytisus proliferus* by the son of Carl Linnaeus in 1781, who was also Carl.

Chamaescilla. Gk *khamai*, dwarf; *skilla*, squill; the squill of the British Pharmacopeia is the bulb of *Urginea scilla* divested of its dry membranous outer scales, cut into slices, and dried. Our species, *C. corymbosa*, is known as Blue Squill or Blue Stars, and is in family Liliaceae.

Cheilanthes. Gk *cheilos*, lip; *anthos*, flower; alluding to the form of the indusium of the spore-bearing parts. *C. tenuifolia*, Rock Fern, is widely spread in and beyond Australia, while Victoria's other two species are known as Cloak-ferns. Fern fanciers call them all Lip-ferns.

Cheiranthra. Gk *cheir*, hand; *anthos*, flower (antheros, flowery); because the petals spread out like the fingers of a hand. *C. linearis*, Finger Flower, is a vividly blue flower fully justifying Brongniart's specific name *cyanea*, but Willis proved the priority of A. Cunningham's *linearis* (despite Hj. Eichler's restoration of *cyanea*), see 'Handbook to Plants in Vic.', Vol. II, p. 200.

Chenolea. Gk *chen*, goose, with diminutive added. Plants formerly included in this genus (which is now restricted to the Mediterranean and South African regions) are classified under *Bassia*, *Kochia* and *Malacocera*.

Chenopodium. Gk. chen, goose; podion, little foot; referring to the shape of the leaves. Victoria has 9 native species, and 6 introduced, most known as various kinds of Goosefoot, but **C. murale* is Sowbane, **C. album*, the oddly named Fat Hen, and **C. ambrosioides*, Mexican Tea. **C. bonus-henricus*, Good King Henry, was included in Ewart's 'Flora of Victoria', but has been excluded by Willis. The genus gives its name to the family Chenopodiaceae.

Chiloglottis. Gk cheilos, lip; glottis, tongue; in allusion to the form of the labellum. Victoria has 5 species, all known as different kinds of Bird-orchid.

Chloris. Gk chloros, green; alluding to the leaves. Victoria has 3 native species, all known as Windmill Grass, and one introduced species, **C. gayana*, indigenous to Rhodesia, as its common name, Rhodes Grass, implies.

***Chondrilla.** Gk chondrile, a name given by Dioscorides for a related plant which exudes gum, ultimately from chondros, gristle, something granular, grit. **C. juncea* is Skeleton Weed, a Eurasian noxious weed spreading in eastern Australia and parts of North America.

Choretrum. Gk choris, separate; etron, abdomen; the extended torus (receptacle) being separated from the perianth by a faintly toothed rim at its summit. Our 3 species are known as different kinds of Sour-bush, the Common Sour-bush (*C. glomeratum*) being known in S.A. as Berry Broom-bush.

Choristemon. Gk choris, separate; stemon, stamen. H. B. Williamson in 1924 discovered a new plant (previously overlooked because of its remarkable outward resemblance to *Leucopogon virgatus*) in the Brisbane

Ranges, and in *Vict. Nat.*, vol. 40, pp. 231-5, set up this new genus on the basis of the principal character being the stamens fixed below the ovary (hypogynous), hence the name. He concluded that Baron von Mueller never botanically explored these ranges, but Willis's comment on *Olearia iodochroa* is relevant here.

Chorizandra. Gk chorizo, I separate; aner, andros, a male; referring to the separate male flowers. Victoria's 2 species are known as Bristle-rushes.

***Chrozophora.** Gk chros, colour; phoros, bearing; because **C. tinctoria*, Dyer's Litmus Plant, provides the purple dye called turnsole. The specific name *tinctoria* means 'used for dyeing' (cf. tincture), and Turnsole (= 'turning with the sun') is another common name of the plant (also formerly used for the Sunflower, *Helianthus annuus*, the Sun-spurge or Wartwort, *Euphorbia helioscopia*, and the Heliotrope, *Heliotropium europaeum*). The blue litmus paper turned red by acids, and turned blue again by alkalis, is derived from various lichens, especially Archil, *Roccella tinctoria*.

***Chrysanthemoides.** The generic name Chrysanthemum, with the New Lat suffix -oides, a contraction of Gk —o + eidos, denoting likeness of form, a thing that is like. The vivid yellow flowers of this troublesome composite resemble those of *Chrysanthemum* (Gk chrysos, gold; anthos, flower). **C. monilifera* is South African Jungleweed or Boneseed, the latter name being an exact translation of *Osteospermum*, the generic name from 1753 until 1943. The latter name is still valid for **O. clandestinum* (Tripteris or Stinking Roger), which is also in the Victorian flora. The rampant spreading of **C. monilifera* is one of the greatest current threats to our native bush; the other would be the Cinnamon Fungus, *Phytophthora cinnamomi*.

Field Naturalists Club of Victoria

Botany Group *8 August*

This month we enjoyed a slide series prepared by Mrs. Ilma Dunn entitled "Looking at Nature-Winter." A well spoken and informative commentary on tape accompanied Mrs. Dunn's beautiful slides which covered many aspects of the winter scene.

Mr. Dick Morrison showed a few slides of lichens collected on the last excursion and there was also a number of collections on display. This trip to Coranderk to study lichens was very successful and a large number of different types were seen. Members much appreciated Mr. Rex Filson's leadership and help in explaining and identifying collections.

Arrangements were completed for a trip to the Macedon area at the end of August to study Eucalypts, which Miss Pat Carolan will lead.

On the week-end of 28 and 29 September the group will visit Seymour where Dr. Colin Officer of Seymour Rotary Club Environment Committee has arranged an inspection of the bushland on the Puckapunyal Firing Range. Any other club members interested in joining the trip for the week-end or on either day should contact the Group Secretary, Mrs. M. Corrick (tel. 857 9937) or the President, Mr. Ian Cameron (tel. 86 7035).

The next meeting on 12 September will be a members night; contributions to the evening will be very welcome. If you have a few slides, nature notes, exhibits or questions bring them along and share them with the group.

Conservation Group *July and August*

The Bendigo F.N.C. are needing support in their submission to the government for purchase of the Whipstick area as some blocks recommended for inclusion have already been sold during the delay. The mining lease of Alcoa for the area between Anglesea and Angahook has been changed to an extractive one and the local conservation group "Angair" is concerned for the flora and kangaroos and the possibility of scars on the landscape.

Three members of the club attended a meeting of ski, bushwalking and field naturalist clubs which recommended the formation of an "alpine society". The objective which seemed to crystallize after long discussion was the integration of the various interests in planning for the Alps.

The billabongs at Seymour face extinction by future road building and we have endeavoured to obtain information on their conservation value and details of proposed and alternate road plans. A request for support for reservation of the ninety odd acres of bushland around the Moorooduc quarry was received from "Mefak" particularly in view of the damage by trail bikes.

Our big job for this month is the preparation of a submission to the L.C.C. on the East Gippsland study area. The next will be the Mallee and our group does need more help from members to cope with these submissions.

F.N.C.V. LIBRARY

The Library will be open on the first and third Tuesday of the month from 1.30 p.m. to 3.30 p.m. Mrs M. Hampton and Miss Gillies will be in attendance to help those members who find it convenient to use the library during these hours.

I hope as many people as possible will make use of this facility.
J.G. MARTINDALE,
HON. LIBRARIAN

Field Naturalists Club of Victoria

Established 1880

OBJECTS: To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency the Honorable Sir HENRY WINNEKE, K.C.M.G., O.B.E., Q.C.

Key Office-Bearers, 1973-1974.

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Mammal Survey: Miss Wendy CLARK, 97 Faraday Street, Carlton, 3053.

Microscopical: Mr. M. H. MEYER, 36 Milroy Street, East Brighton (96-3268).

MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceeding pages of this magazine.

Rates of Subscriptions for 1974.

Ordinary Members	\$7.00
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Full-time Students between 18 and 21 years pay at Junior Member rates.

All subscriptions should be made payable to the Field Naturalists Club of Victoria, and posted to the Subscription Secretary.

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F.N.C.V. DIARY OF COMING EVENTS

GENERAL MEETING

Monday, 11 November — At National Herbarium, The Domain, South Yarra, commencing 8 pm
Speaker — Miss Penny Goldin (The Victorian Public Interest Research Group)
Subject — “*Dandenong Ranges Studies*”.

Monday, 9 December — At National Herbarium, The Domain, South Yarra, commencing 8 pm
Speaker — Mr. R. D. Kent
Subject — “*Some Fundamentals of Weather and Climate*”.

New Members —

Ordinary:

Miss Rosemary Adam, Lot 5 Warringah Cres., Eltham 3095.
Sr. Maree Henderson, Sancta Sophia College, William St., Glenroy 3046 (*Botany and Geology*).
Mr. Tom C. Moore, 7 Williams Road, Mooroolbark 3138.

Joint:

Mr. Sam Ginsberg and Mrs. Fiona Ginsberg, 23 Amess St., North Carlton 3054 (*Marine and Entomology*).
Mr. Gerard M. Vaughan and Mrs. Teresa Vaughan, 69 Mast Gully Road, Upwey 3158 (*Botany*).

Junior:

David G. Andrew, 8 Clendon Road, Armadale 3143 (*Field Survey*).
Philip Ricketson, 13 Hargreaves St., Mornington 3931 (*Mammal Survey Microscopy*).

GROUP MEETINGS

(8 pm at the National Herbarium unless otherwise stated)

Thursday, 14 November — Botany Group Meeting: “*Using a Botanical Key*”. Study and practice in small groups — 3 leaders.

Wednesday, 20 November — Microscopical Group meeting at the Herbarium at 8 p.m.

Thursday, 21 November — Day Group meeting: Bird observing trip to Blackburn Lake. Leader — Roy Wheeler. Bring lunch. Ringwood train leaves Flinders St. Station at 10.53 a.m. Meet at Blackburn Station 11.30 a.m.

Thursday, 21 November — Conservation Group meeting at the Herbarium at 8 p.m.

Thursday, 28 November — Field Survey Group meeting in Conference Room, National Museum, at 8 p.m. Members' Night.

Monday, 2 December — Marine Biology and Entomology Group meeting in Conference Room, National Museum at 8 p.m.

Wednesday, 4 December — Geology Group meeting at Herbarium at 8 p.m.

Thursday, 5 December — Mammal Survey Group meeting at Arthur Rylah Inst., 123 Brown St., Heidelberg, 8 p.m.

Thursday, 12 December — Botany Group Christmas meeting.

F.N.C.V. EXCURSIONS

Sunday, 17 November — Labertouche. Leader: Mr. J. Brooks of the Warragul Field Naturalists Club. The coach will leave Batman Avenue at 9.30 a.m. stop at the corner of Hawthorn and Balaclava Roads at 9.45 a.m. then continue on to the junction of Princes Highway and the Labertouche Rd. which is about 100 yards east of the Longwarry North School making a brief stop in Dandenong on the way. Mr. Brooks will meet the party there at 11 a.m. Bring two meals fare \$2.60.

Sunday, 8 December — Torquay. Marine Biology and General. The coach will leave from Batman Avenue at 9.30 a.m. Fare \$3.00, bring two meals.

Thursday, 26 December — Friday, 3 January — Falls Creek. The party will leave Flinders St. from outside the Gas and Fuel Corporation at 8.30 a.m. on Boxing Day and should take a picnic lunch. Any outstanding fares should be paid by 25 November. Other details were in the September *Naturalist* but as this excursion has been well booked a few members may be accommodated in Sparo Lodge instead of the motel.

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Front Cover:

Home garden, including some lawn and eucalypts; understorey mainly Australian shrubs. This illustration, together with Plate 1 in leading article, gives some indication of different habitats of Bell-miners.

At its October meeting Council had to make decisions regarding the future of the *Victorian Naturalist*, and the subscription rates to the Club. As mentioned in this column over the last few months inflation has dramatically increased the cost of printing the magazine. In 1970 the cost of publishing twelve 32 page issues was \$5463. This year, even with the reduced number of pages over the last few issues, the cost is expected to reach \$8333. As administrative and other costs of running the Club will this year be just over \$3500 the total expenditure for 1974 will be in excess of \$11,800. To meet these costs we have an income this year of \$6300 from subscriptions, a possible maximum of \$2200 in the grants from the Victorian Treasury and the Ingram Trust, plus \$1300 from other sources — a total of \$9800. This means a deficit of \$2000. Last year the Club had a deficit of \$54. Obviously Council could not allow this situation to continue.

Council has therefore decided to increase all subscription rates. It is seven years since the last increase — so it is hoped members will not feel that too bad a job has been done in combating inflation. The new rates to apply in 1973 are — \$10 for metropolitan and overseas members and affiliated clubs; \$12.50 for a joint metropolitan membership; \$8 for country and retired members and juniors receiving *Vic. Nat.*; \$10 for a joint country membership; \$2.50 for a junior membership without *Vic. Nat.*

While Council explores means of obtaining assistance to cover the cost of publication the *Victorian Naturalist* will continue to be issued monthly — except that the January and February issues will be merged. As the magazine has been a monthly throughout its history of over 90 years every means of retaining this frequency of publication will be examined before a change is made. However, if inflation continues at an increasing rate the situation may have to be reviewed after some months.

Bell-Miners in the Melbourne Area

V.O.R.G. Report No. 38

by

ELLEN M. McCULLOCH AND FRANK NOELKER

Survey Aims

The idea of mapping the occurrence of Bell-Miners in the Melbourne Area originated one evening at the home of E. M. McCulloch, where a number of people met to discuss the ecology of various honeyeater species in suburban areas.

Mr. G. W. Swainson, who was studying co-operative breeding of Bell-Miners at the time, was instrumental in the original planning of the survey, which was aimed at recording the location and history of every colony of Bell-Miners in the Melbourne metropolitan area (see Map 1).

It was impossible to trace the history of each colony, as in many cases colonies existed when residents in the area came to live there.

Search of literature showed that Bell-Miners once had a more extensive range, and information has been included to show this, (see Map 2).

Introduction

Little has been published in Australia of the effect of urbanisation on bird species, apart from recording the obvious retreat by some species unable to withstand change of habitat, or statements that some species have adapted to suburban gardens.

The eastern suburbs of Melbourne are the south-western limit of the range of Bell-Miners in Australia. The survey covered this area to the Dandenong

Bell-Miners are Australian honeyeaters of the family Meliphagidae. honeyeaters of the family Meliphagidae. The species was first named in 1801 by the English ornithologist, John Latham, based on a Lambert drawing (Watling

no. 149). Like so many other honeyeaters it had a varied taxonomic career, being firstly described as a thrush.

The calls of some other species e.g. Crimson Rosella *Platycercus elegans* and Indian Mynah *Acridotheres tristis* can sound deceptively like some Bell-Miner notes, so records based only on single calls should be verified.

The scientific name in "An Index of Australian Bird Names Division of Wildlife Research Technical Paper no. 20" 1969 compiled by the Commonwealth Scientific and Industrial Research Organization, Australia is *Manorina melanophrys*.

The birds are 7½ ins (190mms) long, and are olive-green which is lighter on the underparts, with orange beak and legs. They live in colonies and their attractive, if monotonous, bell-like call-notes are conspicuous and readily draw attention.

Methods

Recording forms briefly outlined the aims of the survey and asked for a sketch map showing the position of each colony and how long it had been there, and had space for additional information such as habitat, and proximity to water. A separate form was required for each colony, or for an area where a colony had formerly existed within recent years.

During 1970 these forms were widely distributed at meetings of the Victorian Ornithological Research Group, and the Bird Observers Club, and the existence of the survey was publicised in newsletters and journals of the Victorian Field Naturalists Club, the Ringwood Field Naturalists Club, the Blackburn and District Tree Preservation Society,

the Queensland Ornithological Society, the Queensland Wildlife Preservation Society and by other interested naturalists on a personal basis. Local suburban newspapers published requests for information; three official V.O.R.G. trips were organised in different areas, and requests were made to people living near colonies. All of these methods produced information.

A few of the reports gave conflicting evidence, but in the great majority of cases, they complemented each other.

In 1972 it was decided to check colonies recorded in 1970. Each colony was given a number, and was correspondingly plotted on a map, with a numbered star, red for existing colonies and yellow for colonies now absent. Checksheets with sketch maps endorsed were sent to those people who had previously completed forms, and they were asked to compare them with previous records. Additionally, slightly amended general record forms were again made available to obtain information on new or previously unrecorded colonies.

Within the City of Nunawading, all colonies were checked again in October, 1973 and in January, 1974.

Ornithological journals and other literature dealing with natural history subjects were searched for references. Unpublished MSS of the diaries of F. W. Howe and J. A. Ross were made available from the Archival Collections in Ornithology at the National Museum of Victoria.

Over 120 people provided information, largely by filling in survey forms, and their names are included in Appendix 1. Without their help it would obviously have been difficult to map the metropolitan area, and we thank them sincerely for their contribution.

If we have inadvertently omitted the name of any contributor, we apologise.

General Distribution

In "What Bird is That?" (N. W. Cayley, 1967, revised A. H. Chisholm

and others, Angus & Robertson, Ltd.) p.110, the distribution of the Bell-Miner (or Bellbird) is given as — "Coastal and mountain areas of eastern Australia from south-eastern (Mary Valley) Queensland to south-western Victoria." The notes following state — "Large colonies of these birds establish themselves on timbered ridges or beside creeks (especially in Gippsland) and remain in the one locality for years."

"Distribution of Australian Honeyeaters" G. R. Cannon, *Emu* 62: 145-166, 1962, gives the distribution (p.162) as "Queensland — A few colonies in the McPherson Range and as far north as the valley of the Mary River. New South Wales — a number of colonies are known between Sydney and the Queensland border. Very common in the Gosford district. Numerous south of Sydney. Victoria — colonies through the Dandenongs, their foothills and adjoining eastern ranges. Also recorded on the Glenelg River, in the south-west of the State (*Emu* 24: 157)."

H. R. Officer in "Australian Honeyeaters" (1964 Bird Observers Club) p.69, writes — "Distribution — McPherson Range of Southern Queensland to Victoria, as far as the Glenelg River." In the third impression with amendments, 1971, the Glenelg River is omitted and it would seem that confirmation of this western record is lacking. The 1971 edition gives the distribution as — "From about Gympie in Southern Queensland to the eastern suburbs of Melbourne, Victoria" (p.71).

Recorded Historical Distribution in Victoria, particularly the Melbourne Area.

From the relatively meagre published data available it is impossible to be absolutely sure of early distribution and status of any of our birds. We have selected the following references to show the changing status of this species over the years.

1801 *Emu* 31: p.175-196, 1932, D. J. Dickison "History and Early Records of Ornithology in Victoria," records this species in Westernport Bay, when the *Lady Nelson*, under the command of James Grant, explored the area. On March 31, Grant and Bareillier went up the freshwater river (unspecified). It is recorded that "the sides of the river have trees of a large size growing on them, with much underwood, and we observed a number of birds settling on them. Among these we noted the bird called the Bellbird, which has no remarkable plumage, but a note not unlike the tinkling of a bell; so that when a number of these birds are collected together, the noise is similar to that made by the bells of a team of horses."

1837 *Vic. Nat.* 68: p.175-178, 1952, Lionel A. Gilbert — "Visit of an Early Naturalist to Victoria" records notes by James Backhouse of the species on "the Yarra Yarra during his journey by boat up the river to Melbourne."

1839. *Vic. Nat.* 48: p.213-221, 1932, A. S. Kenyon — "From Port Phillip to Sydney in 1839", records notes from the diary of Edmond Charles Hobson. The exact route near Melbourne is not given, but the quotation for April 7, 1839, p.216, is — ". . . ten miles from Melbourne we came upon the temporary stock station of Mr. Darlot . . . We proceeded on our road but the country between this station and Thornloe's was inferior to that we had passed in the morning. A great deal of barren forest land covered with gravel and broken pieces of agate. Before arriving at the station we passed a creek where I heard the peculiar sound as if from a small bell. This was the note of the bellbird in New Holland. It is never found anywhere save on the banks of rivers or large ponds of good water . . . Before tea we made a strong party to see the bellbirds."

As two days later the party arrived in the morning at Pyalong, it seems logical to suppose that the Bell-miners were

seen enroute around the Whittlesea/Wallan/Kilmore area.

April 18th, 1839 diary, ". . . the beautiful and clear note of the bellbird (*Myzantha flavirostris*) is heard incessantly." This records the species close to Springhurst, near the Ovens River outside the present range. (It would appear that this early Victorian reference has been overlooked by ornithologists, as D.J. Dickison does not include it.)

1840 *Emu* 31: p.175-196, 1932, D. J. Dickison "History and Early Records of Ornithology in Victoria" gives a number of references. P.186 — "Howitt, at the land sale of 1840, purchased an allotment of 95 acres near the junction of the Merri Creek and the Yarra. In describing this locality he says, "The windings of the Yarra in full prospect, both near and far, are beautiful. Some twenty or thirty bellbirds are ringing a merry peal within hearing." This is the present suburb of Clifton Hill.

1843 A. R. McEvey in John Cotton's "Birds of Port Phillip" (MS) 1973. John Cotton records this species in the area of the King Parrot Creek, "The note of the bellbird is heard from morning to night . . ."

1840-1854 *Emu* 7: p.1-17, 1907, I. Batey, "On Fifteen Thousand Acres; it's Bird life Sixty Years Ago." — p.9 "Very common on Jackson's Creek in 1846; gradually diminished and the last half dozen flew up stream as if bent on a journey, about March, 1854. From that date this bird has never revisited the region. Met with it on lower Campaspe in November, 1861. Heard on Hughes Creek, at Avenel, in 1844. Mr. W. Westgarth says it was on the Yarra at Richmond in 1840. I did not meet it again until in Gippsland recently." Jackson's Creek is in the Sunbury area.

1850s. *Bird Observer*, May 1950. W. R. Wheeler "Notes on the Bell Miner" — "Wheelwright recorded them in the

ti-tree and gums by the side of creeks and waterholes in the Mordialloc district in the 1850s."

1874 Letter from N. Wakefield (file), May 31st. 1972, re Olinda Creek area . . . "Bell-Miners were evidently not there in November, 1874, when a von Hugel collected birds there."

1895 Vic. Nat. 14: p.123-128, 1898, Robert Hall — "Notes on the Bird Fauna of the Box Hill District", p.127 — "In 1895 and 1896 a young friend at Bayswater advised me of seeing the greenish-hued birds, and hearing the single calls which are like the notes of a cattle-bell . . . It seemed to me during a late tour in the Grantville locality that the adult birds owned the bell note . . . Beyond Bayswater to the south, two or three little flocks were seen." Grantville is on the south-eastern coastline of Westernport Bay.

1900 "Handbook Australasian Association Melbourne." G. A. Keartland "Birds of the Melbourne District" — "Although Gippsland is the stronghold of this species, they are occasionally met with at Ringwood and Bayswater." "Nests and Eggs of Australian Birds", A. J. Campbell, 1900, pp.417-418 — "In the early days of the State of Victoria, Bellbirds used to exist in the tea-tree (*Melaleuca*) tracts in the neighbourhood of Mordialloc and in the timber along the course of the Werribee River and on the Yarra above Hawthorn. The birds were never destroyed, yet they have mysteriously disappeared — probably removed to other forest retreats — notably to Gippsland . . ."

1904-5 Unpublished MSS in Archival Collections in Ornithology, National Museum of Victoria. Diary of F. E. Howe.

1905-1922 Unpublished MSS in Archival Collections in Ornithology, National Museum of Victoria. Diary of J. A. Ross. Both diaries include notes recorded on extensive egg-collecting on

creeks in the Ringwood area and did not once mention Bell-Miners there. It seems most unlikely that the species, if present, would have been overlooked. It is noted in the diaries that eggs of this species were collected at Pakenham.

1907 *Emu* 7: p.41, 1907, D. le Souef recorded species at Mount Buffalo, March 1907 at 4,500'.

1909 *Emu* 9: pp.234-236, 1909, F. E. Wilson "The Bell Miner (*Manorhina melanophrys*).". Note refers to Beaconsfield as having the nearest colony to Melbourne at that date.

1920s Unpublished survey material. J. Greenwood, "At Bellbird corner area in early 1920s. corner Canterbury Road and Blackburn Road. (Heard when he cycled to and from tennis). Gradually spread from there to Canterbury Road/Springvale Road area about 12-13 years ago, i.e. about 1958-59, before subdivisional explosion, e.g. Parkmore."

(This contradicts other reports saying birds were not there in 1927 and visitors seeking them had to be taken to Montrose in the 1930s.)

1925 *Emu* 25: pp.239-242, 1926, Robert Hall "The Birds of Port Phillip", p.242, lists Bell Miners as being one of the species characteristic of the silurian ridge east of Melbourne in a paper discussing species "in the outer suburbs of Melbourne."

1927 Unpublished survey material, from Mrs. Carol Lawrence, quoting Mr. Whittaker, re Laurel Grove area, Blackburn, that there were no Bell-Miners there then.

1927 *Emu* 27: pp.252-265, 1928, F. E. Howe "Notes on Some Victorian Birds" — "Plentiful and on the increase."

1929-1932 Unpublished survey material, from Mrs. Carol Lawrence, "Colony at Fern Tree Gully, near the junction of the Belgrave and Mt. Dandenong Roads." (picnic remembered.)

1930 *Emu* 30: p.239, "Report of the Bird Observers Club" — "This species . . it is interesting to note, is increasing in numbers."

1930 Unpublished survey material, via Mrs. Barbara Garrett from Mrs. Peeke re Wonga Park/Ringwood area, near Oban Road, "Bell-Miners were in the area where power lines now cross Oban Road in the 1930s when she was there. She was grown up by 1939, and she can always remember them being there when she was a girl."

1930s Unpublished survey material. (Letter, H. Reynolds). During the 1930s there were no Bell-Miners on property at Canterbury Road, Vermont — "... city visitors taken out to Montrose along the Swansea Road, to hear these birds. In 1952, in approximately the middle of the year, a large colony . . . descended on the property."

1934 *Emu* 34: pp.147-148, 1934, Report of the Bird Observers Club. "... proceeded to Kilsyth and Mooroolbark. At the bend of Olinda Creek the silver wattles flooded on the valley with waves of glorious colour. This is the one reserve near Melbourne where Bell-Miners are to be found, and the establishment there must be of very recent years because in the writings of some of the earlier naturalists who knew the place well, they are not mentioned."

1936 *Emu* 36: p.107. G. R. Gannon "Bird Observations on a Southern Trip from Sydney" — (re Mallacoota area) "It would appear that there has been an extension of range since the last excursion." This is after noting early records of Capt. White, "birds not plentiful around Mallacoota and restricted to a small area" and after discussion with a local person.

1939 Unpublished survey material re Laurel Grove area from Mr. Whittaker and Mrs. Grant, per Mrs. C. Lawrence and Mr. Owen Lawrence. Mrs. Grant has lived in the area for 48 years. Mr.

Whittaker "went to live in the area in 1927 when there were no Bell-Miners there. They first came in after the 1939 fires, settling at first in the area on the creek, east of Blackburn Road, then gradually spreading over the whole part." Mr. S. F. Sherlock made a similar observation about this colony.

1950 *Bird Observer*, May 1950, W. R. Wheeler "Notes on the Bell-Miner". "At the present time large colonies exist along the Cardinia Creek, the Olinda Creek, Wilson's Creek and Woori-Yallock. Other colonies occur at Belgrave, Belgrave South, Blackburn, Healesville, Mitcham, Mt. Evelyn, Officer, Pakenham, Tecoma, Warrandyte and Wonga Park districts. Small colonies are to be found at Fern Tree Gully, Bayswater and near Wattle Glen. This last-named colony was first noted by the B.O.C. on a trip there on 18 April, 1948. This was a definite movement away from the wetter forest areas of the Dandenongs and the foothills, into the drier country about Hurstbridge. On 2 January, 1950, a colony of at least two dozen birds was noted at Scrubby Creek about a mile west of Wattle Glen, and still another party on Diamond Creek between Eltham and North Eltham.

"What are the causes of this invasion into the drier areas, and will these colonies become more or less permanent?"

1954 Unpublished survey material. T. Martin re colony Terrara Road — creek tributary to Dandenong Creek. "Birds arriving in large numbers in the summer of 1954 at the south-east boundary at least. I presume that this colony came up along this unnamed creek from the Dandenong Creek area where, as far back as my memory goes, I can remember Bell-Miners being around there."

1955-1965 From survey material, it would appear that during this period a decline in the birds' suburban status

Map No. 1 showing distribution of Bell-Miners in the metropolitan Melbourne area 1974.



commenced, although it is difficult to pinpoint precisely. It coincides roughly with the great expansion of home-building in Melbourne's eastern suburbs.

1966-1973

From the commencement of this survey in 1970, it was obvious that this decline continued until mid-October 1973.

With some surprise it was then noted that there was a general expansion of colonies and an increase in numbers of birds in the City of Nunawading area (for details see section dealing with this).

No general survey over the whole Melbourne area was undertaken at this time but from the small amount of evidence available, it seems probable that the increase in numbers was fairly general.

Historical Distribution

From the information available it is known that prior to 1850, the species was more widespread (see Map No. 2) than it is now.

It is extended as far westward as Sunbury and Werribee and further north (though there are few records of this) to Springhurst, only 16 miles (25.7 km) south of the Murray River. Early records include Mt. Buffalo, Avenel (near Euroa) and "the lower Campaspe". The birds were also at Westernport Bay in 1801 and 1895.

From data covering the period from approximately 1850 to 1920, we have found nothing to suggest that Bell-Miners existed in metropolitan Melbourne, except for the second-hand report by Robert Hall that the birds were recorded in Bayswater in 1895 and 1896.

It seems that in the study area the species was rare at the beginning of this century, that by the 1920s it was becoming more common in the outer eastern suburbs and that this expansion continued in the 1930s.

It is probable that this change of suburban range accelerated in the late 1930s and early 1940s, and a suggestion has been made that instead of being a natural increase in numbers, it was a result of the disastrous 1939 bushfires. This is not proven, but it is an interesting

hypothesis, as we have definite records of movements of some colonies when fire destroyed their area.

By the early 1950s colonies were present in most of the general areas where they are now found.

From 1960 to 1970, the number of colonies in the Melbourne area was declining.

We have not attempted a complete coverage outside the Melbourne area, but judging from available records it seems probable that the general pattern of fluctuation in status was repeated elsewhere.

Survey Map and Present Metropolitan Distribution. Map No. 1.

Within the Melbourne area, colonies are found on the Yarra River and its tributaries, and along Gardiner's Creek and the Dandenong Creek and their drainage systems.

The colony at Kew would appear to be the most westerly at the moment.

Outside the actual suburban Melbourne study area, the birds are particularly numerous along the Diamond Creek nearly to Kinglake National Park, on Arthur's Creek, near Hurstbridge, along Watson's Creek and to a lesser extent, on the Plenty River as far upstream as Janefield. All other tributaries of the Yarra have extensive colonies.

The isolated colony at Baxter on the Mornington Peninsula is of interest.



Map No. 2. Present distribution of the Bell-Miner in Victoria (hatched) 1974. X shows previous records referred to in text.

Bell-Miners in the City of Nunawading

Introduction

Colonies reported in 1970 and others found since have been visited regularly. During March 1972, the whole of this area was systematically searched for colonies not previously recorded. All areas were surveyed again in October 1973 and in January 1974, when it became immediately apparent that a major expansion had taken place since October 1973.

Several colonies had increased so substantially that it seemed impossible to attribute this solely to a good breeding season. However, as 11 out of 15 colonies i.e. 75 per cent, were numerically stronger, it is unlikely that an influx from other districts would simply be absorbed into existing colonies. Seasonal breeding changes have not been recorded to account for this variation,

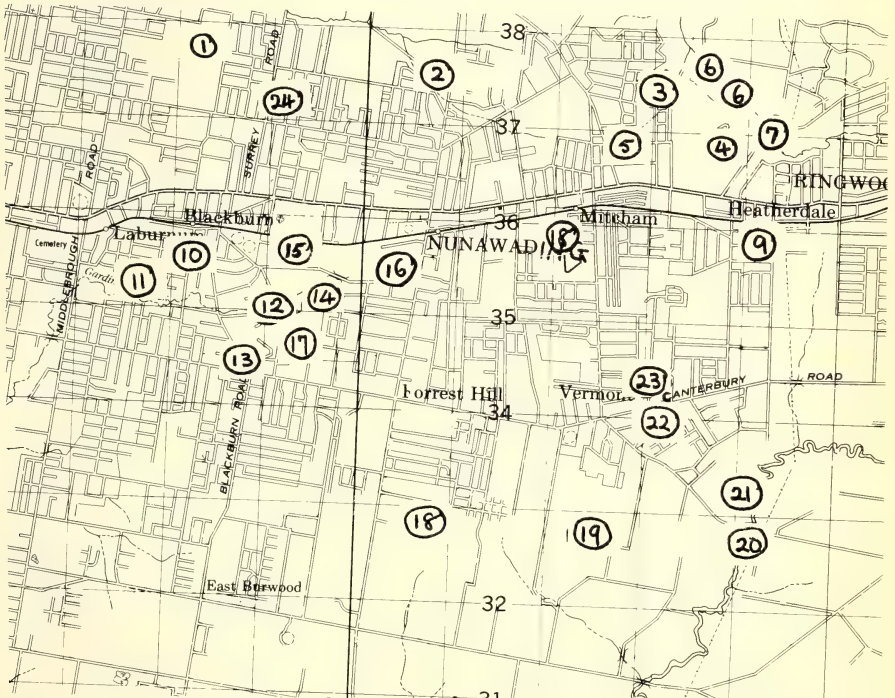
although breeding occurs throughout most of the year.

A search for nests at Blackburn Lake revealed only one, yet several very immature Bell-Miners were being fed by adults.

The two new colonies, N15 and N24, recorded in late 1973, are relatively large, from 30 to 40 birds each, and their origin is unknown.

The accompanying table shows rainfall figures recorded at Mitcham for 1971, 1972 and 1973, plus an annual average compiled over 16 years. It is not known whether this can be related to the sudden expansion of numbers.

The presence of Bell-Miners (or their habitat) in the City of Nunawading and more particularly, in the suburb of Blackburn, has a marked effect on real estate. Frequently one notes "in the



Map No. 3. Numbers indicate location of colonies, not their extent, which is detailed in the text.

heart of the Bell Bird area" or "on the verge of Blackburn's prestige Bell Bird area" in real estate advertisements. It is said that houses in such areas sell well above the price of similar houses elsewhere. Estate agents speak in jest of tape-recordings of Bell-Miner calls in the boots of their cars. An area at Wheeler's Hill, Glen Waverley, has a similar attraction.

A summary of each colony within the City of Nunawading is given to clarify detail of the changing status. See locations on Map 3.

Colony N1

The area occupied is in 6 acres of natural bushland including a damp gully. The property's owner intends to maintain its present condition. He has owned the property from 1955 and advises that Bell Miners were present only during 1966 to 1968 and from 1970 to date. The colony doubled to an estimated 50 birds in late 1973. Previously a gradual decline was evident, and this was particularly noticeable in March 1973 and October 1973.

Colony N2

The arrival of this colony in August, 1971, co-incided with another leaving two miles downstream on the Koonung Creek during bulldozing operations. It is not known if it is the same colony. A local resident of twenty years had not seen Bell-Miners before at this location. Upon arrival they were thinly spread along a 600-yard strip on the western side of Springvale Road, between two branches of the Koonung Creek. The colony gradually became depleted in numbers and constricted during the following year, and became confined to an area of 200 square yards, on a small gully. There are now only 6-10 birds present and this number has remained constant during the 15 months prior to January, 1974.

Colony N3

This colony (or colonies) covers a much larger area than is normal in an

urban area. It is on two gullies which join then run into the Mullum Mullum Creek. Recent subdivision of the Summerhill Estate has split the colony into four parts, even though Bell-Miners have been seen flying for approximately 300 yards over cleared areas. The four areas occupied are

(a) In a gully on Moresby Street,

(b) at the intersection of Moresby Street and Quarry Road, and 150 yards southwest and uphill on Quarry Road,

(c) along the creek in Cassella Street and Quarry Road,

(d) at the end of the new subdivision in Summerhill Court.

Although substantial filling of a gully and road-making has recently taken place, numbers appear to be greater in January, 1974, than in October, 1973. The area at the end of Summerhill Court was not occupied in October, 1973, but 20-30 birds were present in January, 1974. Apart from an absence of 18 months after the 1961 bushfires, which devastated the district, Bell-Miners have been present for at least 14 years.

Colony N4

The area occupied is in a gully on residential and uncleared private land. The age of the colony is 11 years but local residents claim numbers have declined despite little habitat change. Personal observation over the last 2 years has shown no variation of an estimated 25-35 birds.

Colony N5

This is an unusual habitat, as the large eucalypts are isolated by comparison to those in other colony territories. The birds are concentrated in Cherry Court where eucalypts are denser; they spread along Burnett Street to the east and as far as Thomas Street wherever habitat is suitable. No fluctuation in numbers has been noted during the survey. The colony has been there for at least 14 years.

Colony N6

Until late 1973, this colony was located downstream from the Quarry

Road bridge for 300 yards along the Mullum Mullum Creek. This area of relatively undisturbed bushland retained a constant number of Bell-Miners during the period of observation until late 1973. However, between October and December, 1973, a major extension of range occurred, resulting in a minor expansion in territory downstream and a substantial increase upstream from the bridge. The occupied area now extends upstream to opposite the junction of Nara Road and Wattle Valley Road and for 200 yards along the gully towards colony N4. The proposed F.19 freeway, if it proceeds, would probably eliminate this colony.

Colony N7

This colony is situated on both sides of Deep Creek Road along the Mullum Mullum Creek. A gully along the unmade section of Rangeview Grove, near the creek, is also occupied. The two territories are only 100 yards apart and could be treated as separate colonies as Bell-Miners do not appear to integrate. Numbers have also increased in late 1973. The F19 freeway could destroy this area also.

Colony N8

The area occupied was on industrial land adjacent to Mitcham Reservoir in Simla Street. During construction of a warehouse on part of the colony territory during 1972, the birds left the area. Mr. K. Richards reported that numbers were declining in June, 1972. They had been present from at least 1954.

Colony N9

Like colony N8, this colony left about August, 1972, after remaining for at least 15 years. The territory was in an established residential area along the western side of Heartherdale Road, Mitcham, 150 yards south of Forster Street. Eucalypts have been retained in gardens and no obvious change to habitat or disturbance to Bell-Miners was evident prior to the birds leaving.

According to local residents who arrived 15 years ago, vast numbers of Bell-Miners were present in 1957. They declined to an estimated 20 birds over the last few years, before their departure. The only water present was in swimming pools and bird-baths.

Colony N10

When visited in March, 1972, there were about 10 Bell-Miners left, and they were confined to number 36, The Avenue, Blackburn. These birds are probably a remnant of the formerly enormous colony mentioned in the following paragraph. The habitat was in good condition and it appears that other unknown factors caused their departure in May, 1972.

Colony N11

This colony gives Blackburn's real estate agents the opportunity to claim a house is "in the heart of the Bellbird area." Records show that this was once a vast colony extending to Blackburn Railway Station from Acacia Avenue. It has now contracted to around the junction of Linum Street and Laurel Grove. It has been claimed that the colony arrived after the 1939 bushfires. Bell-Miners are still numerous, although many eucalypts are over-mature and dying. Even so, the expansion of late 1973 was also evident with this colony.

Colony N12

Records indicate that this large colony on a branch of Gardiner's Creek tends to expand and contract its territory. There is no obvious reason for this occurrence as it is in a settled residential area with little habitat change. Recently the colony has contracted from Naughton Grove at the southern end of the territory and expanded at Jeffrey Street to the north. Unlike other colonies in the City of Nunawading, numbers remained constant during 1973. It has been established there for at least 12 years.

Colony N13

The age has never been clearly established but this was probably the

oldest colony in suburban Melbourne. It was there before 1939 and possibly was present in 1927. The junction of Canterbury and Blackburn Roads has been affectionately known as "Bellbird Corner" for many years. It is not known if Bell-Miners have occupied the corner continuously. The number of eucalypts has declined since construction of Windemere Drive and subsequent housing development. Bell-Miners gradually declined in numbers over recent years until the last dozen left in August, 1973.

Colony N14

This colony has existed for a number of years at the north eastern corner of Blackburn Lake, and, according to Mr. K. Richards, had been declining in numbers. On Christmas Day, 1970, the colony was absent; however, two weeks later this area was re-occupied. No birds were present the following weekend. The area was vacant until August, 1973, when about 12 Bell-Miners occupied an adjacent but not identical territory. It is interesting to note that colony N13 vacated their territory in August, 1973. We have no evidence to show whether the birds at Blackburn Lake came from N13. By December, 1973, the colony had expanded fourfold in numbers and territory. Immature Bell-Miners were present but only one nest was found.

Colony N15

Until October 1973, Bell-Miners were not in Glen Ebor Avenue, Blackburn. An estimated 30-40 birds now (March, 1974) occupy an area on both sides of this street between Game Street and 50 yards east of Gwenda Avenue. The only water in this established residential district is in bird-baths and swimming pools. The origin of the colony is unknown.

Colony N16

Records of this colony are incomplete as the last few birds left at the commencement of the survey in late

1969. Information supplied by local residents indicates that there was a vast colony for at least 15 years prior to departure. It was situated on a branch of Gardiner's Creek that flows through Winlaton and the Seventh Day Adventist's Camp and Home. Destruction of habitat along the creek probably caused the disappearance of this colony.

Colony N17

The subdivision of Anjaya Court caused a drastic reduction in habitat and numbers of Bell-Miners in the Dickens Street colony. When visited in March, 1972, the colony was thriving on both sides of the street. However, the subdivision appeared to unsettle the birds and by May, 1972, the colony was greatly reduced. By October, 1973, only 6 Bell Miners were counted and they were totally absent in January, 1974. As nearby colony N14 increased substantially and N15 commenced at this time, it is possible that the Bell-Miners transferred to either of these areas. Numbers in Dickens Street were not sufficient to make the significant alteration to these colonies. The colony was in the area for 11 years.

Colony N18

From 1970 to 1973, this colony, on the unmade northern section of Stanley Street, gradually declined. Unlike others it has not increased since October, 1973. Youths on mini bikes have been prevalent and the noise and general disturbance may be the cause of the decrease. The undergrowth is almost entirely blackberry, *Rubus spp.* and Gorse. *Ulex europaeus*. Its future is limited as it is in the path of a freeway and bird numbers have declined to about 10. Records show that colonies of this size do not survive. The age of the colony is not known; however, 30-40 birds were present in 1971.

Colony N19

Information supplied indicates that this colony situated along a small creek

has existed for 25 years and was once very extensive. Bell-Miners were recorded to the verge of Terrara Road during the term of the survey but they are now restricted to near the appropriately named Bellbird Crescent and Glenora Drive. Despite subdivision and clearing of the creek prior to barrelling, a minor expansion took place during 1973.

Colony N20

"Cleaning up" of the Dandenong Creek has considerably reduced suitable habitat for this colony, which extends downstream for 350 yards (320m) from Boronia Road. The colony was declining until late 1973 when it also increased. Blackberries form a major part of the undergrowth.

Colony N21

This colony is the only large one that we know of, to leave an undisturbed habitat virtually "overnight". The territory was in a council owned reserve near Arcady Grove and Abbey Walk, Vermont. Bell-Miners were numerous when the area was visited in July, 1971 but left in September, 1971. The habitat appeared to be in good condition.

Colony N22

The pattern of decline then expansion was obvious in this colony in View Street, Vermont. From July, 1971, when the colony was visited, to October, 1973, the numbers had reduced to such an extent that its continued existence was in doubt. It is now back to its former strength even though many eucalypts are in poor condition. The colony was established in 1952.

Colony N23

Numbers have fluctuated during the term of the survey. Like N22, across Canterbury Road, Bell-Miners were plentiful in July, 1971. They extended along the northern side of Canterbury Road and on both sides of Glenburnie

Road to opposite Fiona Court. They retreated during construction of Canterbury Road and by October 1973, were restricted to a gully running into Gleburnie Road. A recovery was apparent by January, 1974, but not to the extent of former numbers. Destruction of trees on Canterbury Road has restricted expansion. The establishment date of this colony is probably similar to colony N22.

Colony N24

The arrival of this colony in October, 1973, was our first indication of the general increase in numbers. Bell-Miners are on the eastern side of Surrey Road, between Junction Road and Springfield Road in the large building blocks which have retained much of the endemic habitat. The majority of these blocks have been sold as flat sites and in some instances, the houses have been removed. It is unlikely that the estimated 30-40 Bell-Miners present will be able to withstand this development. Residents of twenty years' standing cannot recall Bell-Miners in the area before. Like colony N15, the origin of the colony is unknown.

SUMMARY

Before the increase in late 1973, of the 22 colonies recorded during the survey from 1970, 13 remained in their original locations. One new colony became established, eight areas were vacated and one of these vacated areas was re-colonised after an absence of 2½ years. In late 1973, two large new colonies became established. There has, therefore, been a net decrease in colony numbers from 21 to the existing 17.

Adaption to Suburban Habitat

Colonies in natural bush areas do not appear to be recorded away from creeksides. The only suggestion found which conflicts with this is that by N. A. Wakefield (1941, *Vic. Nat.* 58:103) "The Bell-Miner is particularly abundant in dense tea-tree and eucalypt forest,

generally near water, but often away from it." No examples are given and the distance from water is not indicated. Colonies in suburban areas largely follow the accepted habitat preference of gullies by creeks, but some adaptation is evident. All colonies recorded so far have an overstorey of various endemic *Eucalyptus* species, and a varying understorey. It is generally accepted that the main food of the Bell-Miner is insects, particularly scale insects of the Family Psyllidae. K. C. Campbell and K. M. Moore, 1957 (*Proc. Roy. Zool. Soc. N.S.W.* 1955-56 pp 72-73) "An Investigation of the Food of the Bell Bird *Manorina melanophrys* Latham" state—

"The examination of the stomach contents revealed that the bell birds in the Ourimbah State Forest area, at this time of the year, feed on various insects, lerps and spiders. Beetles and psyllids (both mature and immature) together with their lerps, form the main portion of their diet."

Stomach contents of 3 birds only were examined, and details of what constituted the food of each bird are listed.

G. W. Swainson 1970 (*Emu* 70:185) states — ". . . birds arriving to feed juveniles generally had the mandibles closed, and food items could not be seen, although lerps were often noted near the tip of the bill. In 239 visits where these details were recorded, only three larger items were seen. These were a brown moth, a large insect and a small insect." They have also been seen eating mosquitoes and visiting flowering mistletoes (E. M. McCulloch).

E. M. McCulloch has watched a bird running the needles of a Radiata Pine (*Pinus radiata*) between its mandibles.

H. Reynolds states *in litt.* ". . . the birds seem to be busy in any kind of shrub at any time of the year. Much of the growth here is exotic . . . cypress, plum and maple."

Some rather unexpected adaptation to food available in suburban habitat has

been noted. In at least three known areas in Blackburn, Mitcham and Vermont the birds visit garden-feeders containing a sweet liquid honey/sugar and water mixture, and they also on occasion eat moistened bread at tables, as they do at the Sir Colin McKenzie Sanctuary at Healesville.

They visit garden flowers for nectar, including Australian shrubs such as hakeas and grevilleas not native to the area, and exotics such as Flowering Currant (*Ribes* sp.)

In 1972 several students from Monash University Zoology Dept. studied suburban habitats of Bell-Miner colonies (A. Gilmore, P. Cheal, P. Biggs & F. Bell unpub. MS.) Their comments on eucalypts are quoted, as they co-incide with our own study results. "Preference was not shown by the Bell-Miners for any particular species of eucalypt amongst the several species native to each location, but at Site 6 where *Eucalyptus botryoides* and *E. citriodora* were planted in gardens, Bell-Miners did not go into them, although White-plumed Honeyeaters (*Meliphaga penicillata*) were seen eating psyllids off the leaves of *E. citriodora*." *Eucalyptus* species identified were —

<i>E. goniocalyx</i>	Bundy
<i>E. melliodora</i>	Yellow Box
<i>E. bridgesiana</i>	Apple Box
<i>E. baxteri</i>	Brown Stringybark
<i>E. viminalis</i>	Manna Gum
<i>E. polyanthemas</i>	Red Box
<i>E. obliqua</i>	Messmate Stringybark

We can give no explanation for the preference of one area against a similar nearby area which is not colonised. Seemingly suitable areas can be ignored, and obviously much more detailed study would be required to determine all the factors involved.

Some habitat variations within the study area are illustrated. The shrub layer can vary from heavy to sparse natural vegetation, bush mixed with exotic garden shrubs such as maples and rhododendrons or mainly Australian

shrubs not endemic to the area, to open lawns under large trees.

At the Kew colony the land slopes steeply down to the Yarra river and there is scattered Eucalypt cover, while the understorey consists largely of a heavy growth of South African Boneseed *Chrysanthemoides monoliferum*, a noxious weed, in which the birds nest.

We have tried to check on the proximity of suburban colonies to water. Although they certainly survive away from the immediate vicinity of flowing creeks, some source of surface water appears to be necessary. This can be found in bird-baths either at ground level or higher, swimming-pools, ponds and dams.

Breeding

In the Melbourne area Bell-Miners breed during most of the year.

Nests have been found in the understorey in both evergreen and deciduous trees, shrubs and creepers, in foliage ranging from small (hawthorns) to large (rhododendrons).

Nests are typical of honeyeaters, being rather frail, cup-shaped and suspended from fine twigs or leaves. Nest-sites include hibiscus, Japanese maple *Acer* sp., Lilac, Syringa, Magnolia, Lemon and other citrus trees, Apricot, Hawthorn, Tecoma vine, Azalea, Lilly-pilly *Eugenia* sp., *Prostanthera*, Walnut, Pittosporum, Japonica, *Chaenomeles* sp and Paperbark *Melaleuca* sp.

Data cards were made available from the Nest Record Scheme of the Royal Australasian Ornithologists Union, and we would like to acknowledge their co-operation.

57 records from the Melbourne area (55 G.W. Swainson, 1 E. Dover, 1 D. Thyer) showed that eggs or nestlings were recorded in every month except July, and even then nests were being built.

10 cards from New South Wales include one record (S. G. Lane per C. Broadhead) of eggs in July, and it is probable that future records will extend

known breeding in Melbourne to cover this month.

The records suggest that there are three breeding peaks, in August, October and April, but the available sample is too small to be sure of this.

Height of nests varied from 2ft.3ins. to 26ft. above ground, with an average of 7ft.

It is obvious that the birds adapt readily to nesting in garden shrubs. During the survey we were shown many nests which had been previously used, and it was often commented that particularly when nesting the birds were quite fearless, and would mob cats, dogs and humans, as well as other bird species.

Discussion on statement "Bell-Miners kill trees."

The statement "Bell-Miners kill trees" is frequently repeated when discussions arise with the general public. This appears to be due to the fact that the birds feed on the leaves of Eucalypt trees which may be diseased, and it is thought that the birds carry disease to the trees. It is sometimes suggested that the visible whitish discoloration of the leaves is a fungus or mould which can be transferred, but in fact it is usually the "lerp" or covering of insect species feeding on the leaf sap.

K. M. Moore 1962, *Research Note No. 11 of the Forestry Commission of New South Wales, Division of Forest Management*, wrote on "Entomological Research of the Cause of Mortalities of *Eucalyptus saligna* Smith (Sydney Blue Gum)." On investigation it was found that trees heavily attacked by various species of *Glycaspis* (Family Psyllidae) suffered severe damage. Moore, p.4, states — "During the early stages of an incipient large population, damage is not readily discernible from the ground and the initial attack may be indicated by the presence of bell-birds which feed on the psyllids and lerps."

Later ". . . the vitality of trees which have been almost defoliated many times

over a number of years is thus affected, so that attack on these trees by a number of other insect species may occur."

If trees finally die as the result of debility and heavy insect attack under optimum conditions, the Bell-Miner may be quite incorrectly blamed for the death of the trees.

On the other hand a number of Bell-Miner colonies are known to have existed in the same area for up to 40 years.

Many tree losses in suburban areas are due to road-making, sewerage construction and like disturbances, or alteration to the water table, and the fact that Bell-Miners are also present may mislead.

During a discussion with a resident a dead tree was pointed out as an example of tree-killing by Bell-Miners. Examination showed that, in fact, it had been ringbarked!

Colonisation and Movements.

Bell-Miners are generally regarded as being sedentary, and results of the survey show that recorded colonies tend to remain unless their habitat is extensively altered or destroyed, or unless they are greatly disturbed as, for example, when noisy road making machinery is employed nearby.

Banding did not form part of this survey, and little published data is available. G. W. Swainson's colour-banding (*Emu* 70: 183-188) did not suggest movement between colonies. S. G. Lane 1969 (*Aust. Bird Bander* 7: 27-32) "Tumbi Umbi Banding Summary" states —

"The usually accepted view as to the sedentariness of this species is not evident from the relatively low retrap figures. (392 banded, 29 re-trapped a total of 31 times). Only two individuals have been retrapped more than once — twice each. The total number banded for a species is second to that of the Red-browed Finch yet the number of individuals retrapped is only 10 per cent. The longest elapsed time was four years after banding and

that was the first time the bird has been retrapped.

It is not expected that Bell-Miners would suffer greatly from natural or artificial predation and their numbers appear to be increasing in the area. From personal observations, their colony locations certainly are being extended and local residents have confirmed this observation. Why then should the retrap figures be low? Is it entirely due to their habits, or do they move further and more often than is expected? Their habits may have some effect on the retrapping rate, but generally this should be relative to the banding figure."

Lane, *in litt.* affirms his view that some birds move, but that there has not been sufficient banding done to know whether these are young birds, or adults outside their breeding season.

On p.43 of the same issue of the *A.B.B.* is a report of an adult bird retrapped (alive) at the banding-place over 6 years and 7 months after banding.

D. Mules (unpublished survey data) writes, "they fly backwards and forwards between trees overhanging the creek and those around the base of the hill — over a stretch of open paddock between trees."

F. Noelker (unpublished survey data) "Colony seems to make use of all timbered areas. Birds seen flying three blocks from one tree to another — 250 yards."

There are several records E.M. McCulloch and A.R. McEvey (pers. comm.) of a single bird appearing briefly in an area away from an established colony but within (about) half a mile (0.8km.) of it, then disappearing. This type of visit may last for only a few minutes.

Lane (*op cit*) states that in another part of New South Wales three banded birds were retrapped one mile away from the banding-place. It may well be found that although a colony will occupy one particular area for a long time, there

may be movement of some individuals, particularly if colonies are in fairly close proximity. It is impossible to take this suggestion any further until more banding is done.

F. Noelker reported that in two instances when birds first moved into an area, they were scattered separately in trees some distance away from where the colony was finally established. Birds were also seen 250 yards from another colony. Did they die, move on, or return?

SUMMARY OF SUBURBAN STATUS

Before the survey was commenced it was suggested that future motor freeways would go through many Bell-Miner colonies, and that the metropolitan range of the species could be greatly curtailed. In April, 1973, the proposed plan for suburban freeways was reduced from 307 miles to 157, and it is felt that their construction will not widely affect existing colonies. If, however, Freeway F19 along the Mullum Mullum Creek proceeds, part if not most of Melbourne's best Bell-Miner stronghold will undoubtedly be severely decimated.

We feel that in general the numbers of Bell-Miners in the Melbourne area were declining quite rapidly until mid-October, 1973.

From 1970 until mid-October 1973, notes record decreasing territory areas, fewer birds present, or total absence from a previously occupied location. We cannot always give reasons for this decline, as in many colonies numbers decreased gradually without any noticeable habitat change. On the other hand, we have one record of a numerically strong colony leaving its territory virtually "overnight" for no obvious reason.

The expansion recorded in October, 1973, is detailed for the City of Nunawading. Limited data from elsewhere in the metropolitan area indicates similar increases.

Numerous records show colonies disappearing when habitat is largely

cleared, whether for housing, general "tidying", creek channelling or when creeks are barrelled in for flood control, clearing of areas for roads or clearance of under-growth as a fire hazard.

When carrying out work in an area, some authorities remove every vestige of undergrowth for a considerable distance, and often there appears to be little real effort to encourage plant regeneration or planting programmes.

It is probable that habitat of some existing colonies in Doncaster, Mitcham North and Glen Waverley will be considerably depleted before this paper is published, as land has been subdivided and advertised as building blocks.

It would seem that a possible way to keep colonies existing in suburban areas would be the group planting of endemic Eucalypts to replace some of the many trees now over-mature, and the provision of undergrowth and some surface water.

Acknowledgements

Colonies were marked on base maps supplied by Mr. Reg. Johnson. Rainfall figures were supplied by the Melbourne and Metropolitan Board of Works.



Plate 1
Gully in natural bush.

TABLE I

Rainfall figures taken in points at Mitcham, within the City of Nunawading, Victoria.

	1973	1972	1971	Average 1953-1970
Jan.	135	149	265	215
Feb.	746	633	277	198
March	464	76	135	226
April	309	437	260	266
May	433	212	503	429
June	239	64	320	235
July	196	199	193	292
August	356	259	153	332
Sept.	251	165	308	377
Oct.	361	190	564	334
Nov.	320	229	563	316
Dec.	217	11	332	299

Appendix

Information was received from — Mrs. B. L. Adams, J. Addie, Ms Aird, C. R. Amiet, C. Austin, Mrs. R. P. Balabanski, A. V. Balhorn, J. N. Beale, I. J. Bennet and family, G. E. Billing, P. A. Bourke, D. Bowrey, A. Brown, M. Brownrigg, G. P. Butt, G. A. Campbell, M. Campbell, A. W. Caporn, Mrs. M. Chapman, Mrs. J. Chismon, R. H. Colpus, Mrs. M. Costello, G. Coutts, J. Crowley, M. Darragh, R. Davies, T. Daws, T. Debney, L. Delacca, Mrs. J. Dover, Mrs. P. C. Downie, K. Drayton, J. Debert, F. Dwyer, R. Eaton, Mrs. G. Elijah, E. F. Faggetter, J. B. Faulkner, Ms. C. Falkingham, Mrs. A. Fleming, Mrs. E. Fullarton, Forests Commission of Victoria, A. Gaines, Mrs. B. Garrett, L. Goldson, Mrs. D. Goulding, J. Greenwood, B. Halifax, B. P. Hamilton, K. Harrison, A. B. Hedding, R. N. Hinchey, Keith Hindwood, Bird Recording Service, E. S. Hoskin, Mrs. K. Hough, J. M. Howlett, C. Humphries, T. Hunt, Mrs. J.

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The Origin of Generic Names of the Victorian Flora Part 2 — Latin, Greek and Miscellaneous

(continued from 91 (10))

by JAMES A. BAINES

***Cichorium**. Gk kichorion or kichoreia, chicory (Jaeger); Latinized version of Arabic name for one species (Smith & Stern); Greco-Latin name of Chicory, **C. intybus* (Black, who thus agrees with Jaeger). *Intybus* is a now invalid genus absorbed in *Crepis*, which is in the same tribe (Cichorieae) within

the Compositae as *Cichorium*, and as a specific name was formerly capitalized. Gilbert-Carter states that kichorion appears as a plant-name in both Theophrastus and Dioscorides.

***Cirsium**. Gk kirsion, a kind of thistle, latinized in the usual way. As used in Dioscorides, thought to be

Carduus pycnocephalus, southern European but called Plymouth Thistle in England because well established there. Victoria has 4 introduced species of these thistles.

Cissus. Gk kissos, ivy, in allusion to the climbing habit. Our species, *C. hypoglauca*, Jungle Grape, is found in Victoria only in East Gippsland.

***Citrullus.** New Lat from Old Fr citrulle, any cucurbit, ultimately from Lat citrus, the citron. **C. lanatus* is Wild or Bitter Melon; **C. colocynthis*, Bitter-apple, provides the purgative drug, colocynth.

Cladium. Gk kladion, a small branch; club, baton (klados, branch); alluding to the panicked inflorescence. No fewer than 14 taxa in *Cladium* have now been reduced to one, *C. procerum*, Tall Twig-rush, the others being included in *Machaerina*, *Gahnia* and *Tetraria*, these remarks of course referring only to Victoria's flora.

Clematis. Gk klematis, twig, young shoot, tendrill, diminutive of klema, branch. This generic name is used as a common name for our 3 native species, but the European name Old Man's Beard is often used here too, especially when the massed plumose awns of the achenes trail decoratively over bushland shrubs. There are 250 species in the world.

***Clinopodium.** Gk klinopodion, name of a plant in Dioscorides, diminutive of klinopous, from kline, bed; podion, little foot. The inflorescences resemble the knobs on the feet of beds. Our introduced species, **C. vulgare*, Wild Basil, or, as Keble Martin's 'Concise British Flora in Colour' has it, Cushion Calamint; it was formerly named *Calamintha clinopodium*. *Calamintha* means beautiful mint, the flowers being typical members of Labiatae.

***Cnicus.** Gk knekos, a thistle. **C. benedictus*, Blessed Thistle, was included in Ewart's 'Flora of Victoria' because of its occurrence in the Wangaratta area, 1904-16, but it

appears to have died out, and Willis has removed it from the flora.

Codonocarpus. Gk kodon, bell; karpos, fruit; alluding to the shape of the fruits, *C. cotinifolius* being known as the Bell-fruit Tree for the same reason. The specific name has no reference to cotton, meaning 'with leaves like *Cotinus*', a shrub closely allied to *Rhus*; any more than *Cotoneaster* has, despite the crude mispronunciation sometimes heard: cotton-easter!

Colobanthus. Gk kolobos, mutilated, stunted; anthos, flower. *Colobus* is a genus of Central African monkeys distinguished by the almost complete suppression of the thumb, giving it a 'mutilated' appearance, hence the name. (See Gerald Durrell's 'Catch me a Colobus'.) Bartling may have chosen the name *Colobanthus* because the leaves are connate (fused together) at the base, impossible to separate without mutilation, or merely from the low habit of growth of these herbs, of which Victoria has 2 species (New Zealand has 13).

Comesperma. Gk kome, hair; sperma, seed; alluding to the tufts of hair on the seeds. Victoria has 7 species, the best-known being *C. volubile*, Love Creeper, and *C. ericinum*, Heath Milkwort. The other five are known as various kinds of milkwort. This genus, formerly included in the South American genus *Bredemeyera*, is in family Polygalaceae.

Commersonia. Named by the Forsters after the French naturalist, Philibert Commerson (1728-1773), who as a member of the Bougainville expedition discovered many new species, but his premature death on Ile Bourbon in the Mauritius group meant that his herbarium had to be worked on and the results published by others. (Omitted from Part 1, so included here.) *C. fraseri*, our sole species, is known as Blackfellows' Hemp.

***Conium.** Gk koneion, the classical name for **C. maculatum*, Hemlock, the species that is a noxious weed here. It is

the same plant that killed Socrates.

Conospermum. Gk konos, cone; sperma, seed; referring to the shape of the nut. Western Australia is the headquarters of this genus, with more than 30 species, all known as Smoke-bushes from the appearance of the flowers. Victoria has 3 species, the commonest being *C. mitchellii*, Victorian Smoke-bush or Mountain Conosperm.

***Conringia.** Named by Adanson after Dr. Hermann Conring, 1606-1681, professor of medicine, philosophy and jurisprudence at Helmstedt, West Germany. Often a weed in crops, **C. orientalis* is known as Treacle Mustard or Hare's Ear. (Omitted from Part 1.)

Convolvulus. Lat, little twiner, from convolvere, twine around. Our native species, *C. erubescens*, is Pink Bindweed, or, as the specific name indicates, Blushing Bindweed, while the introduced species, **C. arvensis*, is Common or Field Bindweed; it is called Lesser Bindweed in South Australia. The word bindweed came into English in 1548, with the i pronounced long, as in bind, not short, as it is often heard (the i is short in German, as it was in Old English).

***Conyza.** Gk konyza, name in Theophrastus for a strong-smelling plant, probably fleabane. Victoria has 3 species, of which only two are widely distributed: **C. bonariensis*, Tall Fleabane (the specific name meaning 'from Bonaria', i.e. the Lat form of Buenos Aires, which is Spanish for 'good air'), and **C. canadensis*, Canadian Fleabane. Both these appeared in Ewart's 'Flora of Victoria' as *Erigeron*, a closely related genus of fleabaness.

Coprosma. Gk kopros, dung; osme, smell; alluding to the fetid smell of many species when bruised. An unpleasant meaning (or sound) can be avoided in common names, as when Faires' Aprons replaced Purple Bladderwort for *Utricularia dichotoma*, but nothing can be done about botanical names such as

Coprosma or names like *Phallus impudicus* and quite a number of others. Where ignorance is bliss, 'tis folly to be wise, hence *Coprosma* is used as the common name for most of the 8 species in Victoria, but *C. quadrifida* is Prickly Currant-bush, and the Maori names Taupata and Karamu are used for 2 species introduced from New Zealand, which is the headquarters of the genus with 45 species.

***Coronopus.** Gk koronopous, name of a plant in Theophrastus, perhaps *Plantago coronopus*, Buck's-horn or Crowfoot Plantain, from korone, crow; pous, foot. **C. squamatus* is Swine's-cress, and **C. didymus*, Lesser Swine's-cress. The accent should fall on the second syllable.

***Corrigiola.** Lat diminutive of corrigia, shoe-string, boot-lace, or horse's rein, from corrigo, make straight or correct. Our species, **C. litoralis*, is one of 10 cosmopolitan species, and found in only the N and R grids. It is in family Caryophyllaceae, and is known as Strapwort.

Corybas. Gk korybas, one of the dancing priests of Phrygia (plural, korybantes). They worshipped Cybele or Rhea by dancing and performing wild, ecstatic orgies to the accompaniment of drums and cymbals. The Greek accent fell on the second syllable (as given in Black), but the generic name is usually stressed on the first syllable in Victoria. Willis lists 5 species of these Helmet Orchids, but a new species, *C. hispidus*, was described by D. L. Jones last year (*Vict. Nat.* 90, p. 96). The common name is derived from the shape of the flower (see *Corysanthes*, next entry).

Corysanthes. Gk korys, helmet; anthos, flower. All our species of *Corybas* were listed in this genus (founded by R. Brown in 1810) by Ewart, but *Corybas*, Salisbury's genus of 1805, had priority. Perhaps the Phrygian dancers wore helmets during their frolics!

***Corydalis**. Gk koridallis, also koridos, the crested lark; from the shape of the flower (cf. larkspur). ***C. capnoides**, apparently present at one time in the Wimmera, has not persisted, and Ewart's inclusion of it has not been accepted by Willis, there being no specimens in Melbourne's herbarium. It is a close cousin of Fumitory (family Fumariaceae).

Cotula. Gk kotyle, cup-shaped, from kotile, the graduated liquid measure used for medicines in ancient times, but Gilbert-Carter rejects this origin in favour of medieval Lat cotula, diminutive of cota, the Italian name of *Anthemis cota*. Smith & Stearn give the meaning as 'a small cup', given because the bases of the leaves form cups; Black however considers it is in allusion to the shape of the flowerhead.

F.N.C.V. EXCURSIONS (continued from p286)

Tuesday, 12 August — Thursday, 28 August, 1975 — Would any members be interested in a block booking on a standard tour from Darwin to Perth which includes Katherine Gorge, Ord River, Falls Creek, Geiki Gorge, Fitzroy Crossing, Broome, Port Hedland, Dales, Yampire and Wittenoon Gorges, Tom Price, Harratha, Exmouth, Cape Range, Charles Knife, Canyon, etc., Cainarvon, Geraldton, Perth. This would not be like our usual excursions where we charter our own bus but it would be an opportunity to see these places with friends. The cost of such a trip is \$829 including air fare to Darwin, overnight accommodation in Darwin, coach travel, accommodation and meals Darwin to Perth, overnight accommodation in Perth and airfare to Melbourne, if 15 or more members went there would be a reduction of at least \$50 per person. Members wishing to do so could leave earlier and have extra time in Darwin or extend their stay in Perth. Will anyone interested let the excursion secretary know as soon as possible so arrangements can be made.

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A book written by Dick Johnson with a foreword by Sir Garfield Barwick and published by the Victorian National Parks Association. The theme of the book is that the conservation of the high country is best realised in the creation of a large contiguous Alpine National Park.

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to create an Alpine National Park. The book describes the alpine environment and discusses problems and conflicts in the current management of the region's resources. Further the idea of wilderness and the function of national parks are discussed and a concept of an Alpine National Park is presented together with recommendations for management through which the values of the region may be best conserved for man in perpetuity.

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For Further Information

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Field Naturalists Club of Victoria

Established 1880

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F.N.C.V. DIARY OF COMING EVENTS

New Members —

Ordinary:

Mr Marc Gottsch, 20 Glengarrie Avenue, Burwood 3125. *Birds*
Dr A.B. Owen, Box 44, Northland P.O. 3072. *Etnomology & Marine*
Mr Thomas Roberts, 37 Raglan Street, South Melbourne, 3205 *Mushrooms*

GROUP MEETINGS

(8 p.m. at the National Herbarium unless otherwise stated).

Thursday, 12 December — Botany Group. Mr. I. Morrison will speak on his recent visit to New Guinea. The meeting will conclude with supper. Please bring a plate with a small contribution.

The other groups will not meet between the second week in December and the January General Meeting unless announced at the group meeting previous, normal group meetings will resume after the second week in January.

GENERAL MEETINGS

Monday, 9 December

Subject "Some Fundamentals of Weather and Climate" — Mr R.D.Kent

Monday 13 January

Subject "Members Night" + Organiser Mr Ian Cameron

Monday 10 February

Subject "Naturalist in North West Australia" — Dr Jim Willis

F.N.C.V. EXCURSIONS

Sunday, 8 December — Torquay. Marine Biology and General. The coach will leave from Batman Avenue at 9.30 am. Bring two meals fare \$3.00.

Thursday, 26 December — **Friday, 3 January** — Falls Creek. Details in last month's Naturalist.

Sunday, 19 January — Bus excursion led by Mr D. McInnes on Geology toward the Coast. The coach will leave Batman Avenue at 9.30 am. Fare \$2.50. Bring two meals.

Tuesday, 12 August — **Thursday, 28 August, 1975** — Would any members be interested in a block booking on a standard tour from Darwin to Perth which includes Katherine Gorge, Ord River, Falls Creek, Geiki Gorge, Fitzroy Crossing, Broome, Port Hedland, Dales, Yampire and Wittenoon Gorges, Tom Price, Harratha, Exmouth, Cape Range, Charles Knife, Canyon etc., Cainarvon, Geraldton, Perth. This would not be like our usual excursions where we charter our own bus but it would be an opportunity to see these places with friends. The cost of such a trip is \$829 including air fare to Darwin, overnight accommodation in Darwin, coach travel, accommodation and meals Darwin to Perth, overnight accommodation in Perth and airfare to Melbourne, if 15 or more members went there would be a reduction of at least \$50 per person. Members wishing to do so could leave earlier and have extra time in Darwin or extend their stay in Perth. Will anyone interested let the excursion secretary know as soon as possible so arrangements can be made.

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Front Cover:

- Female Hair Seals lolling on
the beach at Seal Bay.
Photo: Author.

The report issued this month by Sir Henry Bland to the Victorian Government on administration of conservation, environmental, and land use planning matters should be read carefully by all concerned. It correctly points out many of the defects in the present system. However, serious doubts have been expressed by some eminent persons involved with conservation and natural history about the recommendations made in the report. Were it adopted in full much of the present administrative structure established to deal with conservation, the environment, and planning would be abolished. Bodies that would then disappear include the Land Conservation Council, the Environment Protection Council, and the Port Phillip Authority. Others would also go, or be merged, or changed in character or name.

Some proposals in the report undoubtedly have merit. The proposal to establish an Environmental and Planning Appeals Tribunal by merging the present Town Planning Appeals Tribunal and the Environment Protection Appeal Board may be considered good. The suggestion that administration of the Wildflowers and Native Plants Protection Act be taken out of the hands of the Forest Commission may or may not be favoured by botanists. Certain it is that persons working as either amateurs or professionals in almost any field of conservation or natural history within Victoria will be affected in some way by proposals in this report.

How much of the report will be implemented by the Government has, it is understood, yet to be determined. It seems there is therefore an opportunity for those outside official circles to make some effective comment on the report to their Parliamentary representatives, and the Government. It would appear advisable that many members obtain for themselves a copy of this "*Second Report of the Board of Inquiry into the Victorian Public Service*", and study its possible impact on their interests. The report, of 57 pages, is complex and far reaching in scope — you should not rely on press reports to assess its effect.

F.N.C.V. Excursion to Kangaroo Island S.A.

1-9 September, 1974

by

ELIZABETH K. TURNER

in collaboration with

E. COSTERMANS, I. JACKSON, L. M. WHITE (Flora),
B. & F. DENTON (Avifauna) and M. TAYLOR (Fauna).

Captain Mathew Flinders, R.N., sailing east in the "*Investigator*", discovered and named Kangaroo Island in 1802. He landed on the eastern portion of the island, the Dudley Peninsula (see Map) and is alleged to have had his Christmas dinner at Christmas Cove (see Plate 1).

Thirty nine Field Naturalists from Victoria rediscovered the island to their own satisfaction in 1974 — most of their dinners were had at a comfortable Motel in Kingscote, in the north-eastern portion of the main island.

During the week they were conveyed by bus over the routes marked on the map, with many prolonged stops for walking and observation; the procession usually being led by the "BIRDOS", with arms up and field glasses at the ready; and whose vigilance and keen-sightedness collected for them 85 species (see Appendix 1).

Next in the procession came straggling conglomerations of botanists, mostly with heads lowered or peering through hand lenses (see Appendix 2). Finally, a few roving geologists zig-zagged about, hammering rocks!

In one respect it was unfortunate that Flinders did not circumnavigate the island first, as meeting up with Baudin in "*Le Geographe*" at Encounter Bay, it was left to the Frenchman's cartographer, Freycinet, to sail around the island giving French names to many of the coastal features. The pronunciation of these names by the local inhabitants bears little resemblance to the original French, and

one must interpret the colloquial name for identification of the locality.

Physiography

The island lies with its 90 mile long W-E axis, like a barrier across the southern entrance to St. Vincent's Gulf. Its average width is 25 miles and Kingscote is some 70 miles south of Adelaide. The party comfortably travelled this distance by plane in 20 minutes or so.

The northern coast consists of steep bold cliffs of old rocks, sometimes capped by limestones and blown sands and is separated from the Yorke peninsula by the shallow Investigator Strait. The north-east coast is separated from Cape Jervis on the mainland by the deep Backstairs Passage which represents the bed of the ancient St. Vincent's river which flowed when the island was part of the great south-eastern Australian continent.

The central plateau running W-E across the island is part of the Adeladian geosyncline and was at one time continuous with the Mt. Lofty Horst prior to the last rise in sea level. This occurred in recent times, perhaps 8,000 to 10,000 years ago, thus isolating the flora and fauna from the mainland which evolved often with particular insular characteristics.

The island now consists of 1680 square miles and is the second largest island off the south-eastern Australian coast. It has no mountains but from elevated areas, such as depicted in (plate 2) an excellent view may be obtained. The island consists basically of deep-seated

Plate 1. Christmas Cove, where evidence of Permian glaciation is found. The post in the foreground points to a large, smooth outcrop of Cambrian quartzite, grooved by ice.



granite overlain by a thick formation of ancient marine limestones and windblown sands. On the western and southern coasts the sandhills have often consolidated into sand-rock and there are prominent headlands of granite; often decomposed and eroded into fantastic shapes as at Admiralty Arch (plate 3) and Remarkable Rocks (plate 4). In some places there are extensive belts of blown sand bordering the coast where the sand dunes are hundreds of feet high and devoid of any vegetation. We visited such a place as this, known locally as the Little Sahara, west of Cape Gantheaume where, behind the dunes, the lilac-blue flowers of the *Olearia rudis* were prolific.

The eastern side of the island is more irregular with lower cliffs, and offers more shallow coves and sand bays to shelter boats, except for Cape Willoughby where we visited the lighthouse which is perched on a bold granite headland 173 feet high. Along the littoral of Antechamber Bay, Pelican Lagoon (where we saw two pelicans only), and Nepean Bay it was possible to note evidence of recent elevation of the coastline above high water mark. Also along the cliffs of the north-east coast there was evidence of old glacial clay

(said to be excellent for agriculture); this contained ice-scratched erratics (see plate 1). These 'travelled' stones in various sizes were found on some of the beaches.

The Dudley Peninsula, which represents the western extremity of the recent volcanic area of Southern Australia was, until a recent date, entirely surrounded by water. Gypsum (a sedimentary rock precipitated from evaporating sea water) was being mined at Ballast Head, north of American River.

We were informed that the rainfall varies from 22" in the east to 30" in the west, but this seemed to us an underestimate as rain occurred each afternoon of our visit and the fields were full of water pools when viewed from the air.

Fauna

No aboriginals were found on the island at the time of discovery but later camp sites of very primitive pre-Australoid man have been discovered at the eastern end.

The island is free of foxes, dingoes and rabbits but there are wild pigs, descendants of those released by Baudin; and only one species of snake, the Black Tiger (*Notechis scutatus niger*), a live

specimen of which was found by our party. This tendency to melanism was seen in other island species — the sooty-brown coat of the Kangaroo was much darker than the mainland form, the Grey Kangaroo. We also noted darker markings on the Crimson Rosellas.

A list of mammals seen alive appears in Appendix 3, but it was unfortunately common to see some of the smaller mammals dead on the road.

There are said to be twelve species of mammals indigenous to the island excluding Cetaceans — we found six. Professor Wood Jones and others introduced the Victorian koala to Flinders Chase (see Map) in 1923 and later, in 1946, the platypus was introduced to the Rocky River, also in the Chase; both species appear to be well established there.

It was a special delight to be able to walk among the Hair Seal families at Seal Bay, especially after reading of the countless thousands slaughtered for their skins at the beginning of the 19th century; and quite pathetic to hear the howls of a frustrated yearling pup who tried desperately and unsuccessfully to suckle from several sunbaking females, only to receive a rebuff in the form of a growl or a bite. Many of the enormous old bulls had rocked themselves up the

steep sand dunes and across the roadway into the natural shrubbery of the cliff to sunbathe, their subcutaneous fat quivering as they rolled about and yawned.

We saw one goanna (*Varanus varius*) only, about 2' 6" in length crossing the road and a few small unidentified skinks and frogs.

The Natural Vegetation

This has been severely eroded in recent times for agriculture but there are still large natural areas and reserves including the famous Flinders Chase of 212 square miles at the west end, which was declared a sanctuary in 1919 and has been maintained in its natural state due to the initial efforts of the Adelaide Field Naturalists' Club, and the Fauna and Flora Preservation Board.

The most ubiquitous of the natural trees was the narrow-leaved mallee (*E. cneorifolia*) which grew in the hedges surrounding farmlands and along the roadsides (see Plate 2) together with wattles, melaleucas and casuarinas.

Near rivers and streams and at the western end of the island there were often tall eucalypt forests including the White Gum (*E. leucoxyton*), Sugar Gums (*E. cladocalyx*), Pink Gum (*E.*



Plate 2. Photograph taken from edge of Cygnet fault, overlooking fertile Cygnet River valley.

rugosa) and a few River Red Gums (*E. camaldulensis*). Koalas seemed to appreciate the planting of *E. viminalis* at the back of the Rocky River homestead. The Swamp Gum (*E. ovata*) and Messmate (*E. obliqua*) were also seen, as well as the Cong Mallee (*E. globata*), The Cup Gum (*E. cosmophylla*), *E. diversifolia*, *E. fasciculosa*, *E. fecunda*, *E. remota*, which extends into the Victorian Mallee, and many stunted *E. baxteri* were seen along the coastal headlands. This species must surely have been named for William Baxter, a gardener sent from England to Kangaroo Island to collect seeds and roots in 1823? — He also collected *Correa pulchella*.

Along most roadsides the gardens of wild flowers were a delight; ranging from blue of the *Scaevolas* and *Dampieras*, to gold of the *Asterolalias* and *Hibbertias*, white of *Logania*, to palest pink of *Eriostemon* and darker pink of *Boronia*, to lilac of *Baeckea*. In some areas it was impossible to tread without bruising a flower. We were greatly helped with our identification of species by the small

book on wildflowers written by Mrs. Ida Jackson who accompanied us on several of the excursions. Her book lists the wildflowers under four headings:

1. Limestone areas,
2. Coastal areas and salt marshes,
3. Plants of the ironstone rubble,
4. Lilies, Iris, Insect-eaters and others.

A list of the flora appears in Appendix 2, and includes Wattles, Tea-trees, Native Pines, Casuarinas and orchids which are not included in Mrs. Jackson's first book.

The Avifauna

Mathew Flinders in 1803 and later Captain George Sutherland in 1819 saw the dwarf emu but it disappeared before the arrival of white settlers in 1836, possibly due to some natural catastrophe, although there was a small community of settlers at Cygnet River in 1816.

The mainland emu was introduced into the Chase and is well conditioned to the tourist. It was hilarious to see the instantaneous reaction of several emus

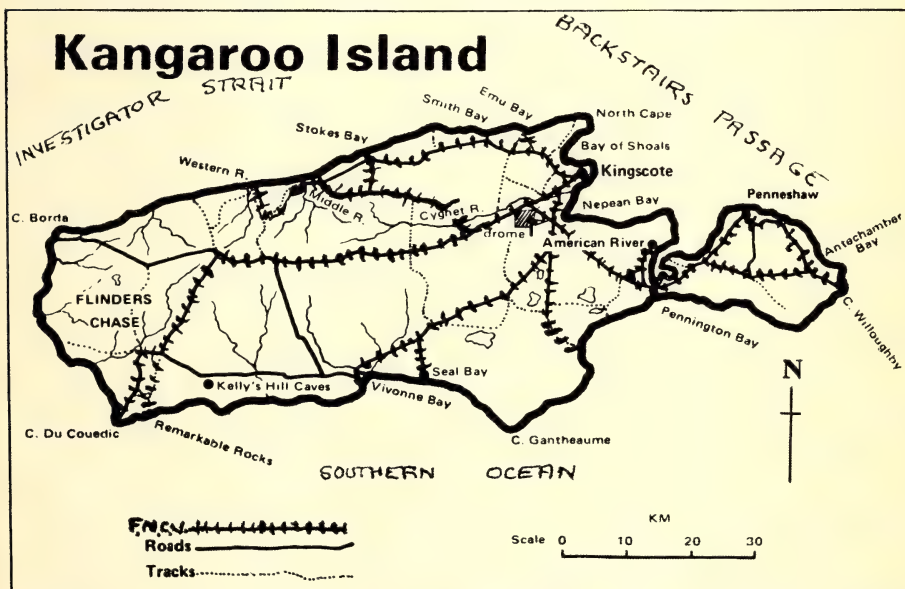


Figure 1. Map showing routes taken by F.N.C.V. members.



Plate 3. Admiralty Arch. Note the hard, dark grey Cambrian-quartzine floor and 'stalactites' in the dune limestone (calcrete; above).

grazing quietly in the Chase, when our bus rattled over the cattle-grid. With heads down they padded swiftly along in a bee-line and arrived with open beaks awaiting the crusts which were brought in an old bucket. Mrs. George Lonzar, nee Hansen, daughter of the second ranger of the Chase and wife of the present ranger, supplied some of our party with hot scones while the others guarded their lunches from the snapping beaks of the emus.

Birds were mainly of the South Eastern open forest and woodland forms; however galahs seemed to have arrived lately in hundreds, and black-backed and white-backed magpies appeared in almost equal numbers in the fields. Flocks of Yellow-tailed Black Cockatoos seemed to live happily though noisily almost in the centre of Kingscote, the largest town.

To complete the list of fauna and flora I should perhaps include a virulent,



Plate 4. Remarkable Rocks (South coast). Eroded granite rocks on a bold granite headland.

unidentified micro-organism, perhaps not endemic to the island, which struck down eleven of our party simultaneously on the fifth day. However, as a recompense for the inconvenience we had another excursion to the northern

coastline, including Western River and the Middle River Reservoir (which supplies the water for Kingscote) and this trip was probably the most spectacular and scenic of them all.

Appendix 1

LIST OF BIRDS OBSERVED ON KANGAROO ISLAND FROM 1 SEPTEMBER TO 8 SEPTEMBER, 1974 INCLUSIVE

(Reference for Names and Sequences — Handlist of the Birds of South Australia by H. T. Condon, 1968).

The attached list contains 85 species, including the introduced Emu and three species introduced from overseas.

For the purposes of recording, Kangaroo Island was split up into five sections —

(1) Kingscote — Within 10 kilometres of Kingscote plus road to airport, and airport.

(2) Eastern — Area east of line drawn from Kingscote south to Pennington Bay.

(3) Northern — North of Playford Highway, excluding areas covered in (1), (2) and (5).

(4) Southern — South of Playford Highway, excluding areas covered in (1), (2) and (5).

(5) Flinders Chase — Flinders Chase National Park and sightings seen from road on eastern boundary of Flinders Chase.

tailed Eagles together on eastern edge of Flinders Chase, and an Osprey flying in and then sitting on a nest on a rocky outcrop on the south coast of Flinders Chase. The nest, built from sticks was at least 7 feet high.

One common Sandpiper was seen at mouth of Middle River. A pair of Peregrine Falcons were seen flying up and down the valley at the mouth of Western River, vigorously calling, together with a White-breasted Sea Eagle in close proximity. For sheer beauty, a small sand bank at Reeves Point was occupied at the one time by one Eastern curlew, 80 Pied Oyster-catchers, 25 Sooty Oyster-catches, 2 Caspian Terns, 25 Crested Terns, two Little Pied Cormorants and 10 Black-faced Cormorants, all framed by the waters of the Bay of Shoals, on which Pelicans and Cormorants were searching for food.

Highlights were sightings of six Wedge-

	Kingscote	Eastern	Northern	Southern	Flinders Chase
<i>Dromains novaehollandiae</i> Emu					X
<i>Eudyptula minor</i> Little Penguin		X	X		
<i>Podiceps novaehollandiae</i> <i>Podiceps novaehollandiae</i> Little Grebe					
<i>Pelecanus Conspicillatus</i> Australian Pelican	X	X			
<i>Phalacrocorax fuscescens</i> Black-faced Cormorant	X				
<i>Phalacrocorax varius</i> Pied Cormorant	X		X	X	

	Kingscote	Eastern	Northern	Southern	Flinders-Chase
<i>Phalacrocorax melanoleucos</i>					
Little Pied Cormorant	x		x		
<i>Ardea novaehollandiae</i>					
White-faced Heron	x	x	x	x	x
<i>Egretta sacra</i>					
Reef Heron		x			
<i>Threskiornis molucca</i>					
White Ibis	x				
<i>Cereopsis novaehollandiae</i>					
Cape Barren Goose			x		x
<i>Cygnus atratus</i>					
Black Swan	x	x		x	
<i>Anas superciliosa</i>					
Black Duck		x	x	x	
<i>Anas castanea</i>					
Chestnut Teal		x			
<i>Chenonetta jubarta</i>					
Maned Goose			x		x
<i>Elanus notatus</i>					
Black-shouldered Kite					x
<i>Aquila audax</i>					
Wedge-tailed Eagle		x	x		x
<i>Haliaetus leucogaster</i>					
White-breasted Sea Eagle			x		
<i>Circus approximans</i>					
Swamp Harrier		x	x		
<i>Pandion haliaetus</i>					
Osprey					x
<i>Falco berigora</i>					
Brown Hawk	x		x		
<i>Falco peregrinus</i>					
Peregrine Falcon			x		
<i>Falco cenchroides</i>					
Nankeen Kestrel	x	x	x	x	x
<i>Haematopus ostralegus</i>					
Pied Oyster-catcher	x	x		x	
<i>Haematopus fuliginosus</i>					
Sooty Oyster-catcher	x	x			x
<i>Vanellus miles novaehollandiae</i>					
Spur-winged Plover	x	x	x	x	x
<i>Vanellus tricolor</i>					
Banded Plover		x			
<i>Charadrius rubricollis</i>					
Hooded Dotterel		x	x		
<i>Charadrius bicinctus</i>					
Double-banded Dotterel			x		
<i>Arenaria interpres</i>					
Turnstone				x	

**Field Naturalists Club of Victoria
APPLICATION FORM**

To be used by new members or subscribers.
(Cross out parts which are not applicable)

I wish to subscribe to the *Victorian Naturalist* for 1975. Please post it monthly to the address below.

Ordinary

I wish to apply for Country membership of the Field Naturalists Club
Junior

of Victoria

My full name and address is:

Mr.
Mrs.
Miss
.....
.....

I enclose the sum of \$ in payment of the year's fee.

Date / /1975.

Signature

.....
(Cut along this line)

**The Field Naturalists Club of Victoria
ELECTION OF OFFICE-BEARERS**

Under the terms of the Articles of Association, nominations for elections to Council at the Annual General Meeting must be received by the Secretary two calendar months before the Annual General Meeting, i.e., by the January General Meeting. I therefore call for nominations for the following positions:-

President	Vice-Presidents (2)
Secretary	Treasurer
Assistant Secretary	Assistant Treasurer
Editor	Librarian
Assistant Editor	Assistant Librarian
Excursion Secretary	Residual Councillors (5)

Any financial member may nominate for any of the above positions. Nominations must be proposed and seconded by financial members, and nomination forms must be signed by the nominee, the proposer and the seconder.

It is most important that nominations be received for all positions as the Club cannot function effectively without a complete, enthusiastic and effective Council.

R. H. RIORDAN,
Honorary Secretary

(see over)

The Field Naturalists Club of Victoria
AN INVITATION TO PERSONS INTERESTED IN AUSTRALIAN
FAUNA, FLORA AND COUNTRYSIDE

If you have not already an affiliation with the F.N.C.V., you may apply to the club either for membership or for regular subscription to the *Victorian Naturalist*.

These are some of the club's activities:

- General meetings each month, with informative, illustrated talks by prominent naturalists. These are held on the second Monday of each month, at the National Herbarium, South Yarra.
- Meetings of study groups comprising those with specialized interests such as geology, botany, microscopy, entomology, native fauna, etc.
- Organized excursions led by nature experts, to places of interest, both near and far.
- The maintenance of a large lending library of nature books and magazines.
- The publication monthly of the *Victorian Naturalist* a well-illustrated nature magazine produced for the general reader as well as the expert. This is issued free to all members.

Membership is available to any person interested in nature; it is not necessary to have any specialized knowledge.

Membership Fees for the year 1975 are:

Ordinary members (living within 20 miles of G.P.O. Melbourne)

Country members (living over 20 miles from G.P.O. Melbourne)

Junior members (under 18 years of age)

Non-members may subscribe to the "Victorian Naturalist"

If you are interested in either membership of the club or subscription to the *Victorian Naturalist*, please complete the appropriate parts of the form on the reverse side of this leaf and post it to:

Honorary Secretary, F.N.C.V.,
National Herbarium, South Yarra, Victoria 3141.

.....
(Cut along this line)

The Field Naturalists Club of Victoria

ELECTION OF OFFICE-BEARERS

Nomination Form

I, of.

..... hereby nominate.

for the position of of.

Second by of.

.....

I hereby accept nomination as a candidate for the above position.

Signed. Date.

(To be removed)

Subscriptions Now Due

The Field Naturalists Club of Victoria is administered by a relatively small number of honorary office-bearers.

The growth of the club and the expansion of its activities, particularly in connection with the production of the *Victorian Naturalist*, are continually adding to the burden of work.

It is therefore requested that fees and subscriptions be paid as promptly as possible, in order to help lighten some of this burden. The financial year commences on 1 January, 1975.

If you will not be paying your fees at one of the forthcoming general meetings, please remit them by post, using the form provided on the reverse side of this leaf.

This procedure will save office-bearers' time, and expense, in sending out reminder notices.

PLEASE ATTEND TO THIS MATTER NOW

You may help further by passing the following leaf on to an acquaintance who is not a member of the F.N.C.V. or a subscriber to the *Victorian Naturalist* but who might be interested in either.

NOTES:

1. Membership fees for the year 1975 are as follows:

Metropolitan	\$10.00
Joint Metropolitan	\$12.50
Country subscribers, and retired persons over 65	\$8.00
Joint Country	\$10.00
Junior	\$2.50
Overseas	\$10.00
Junior with "Naturalist"	\$8.00
Individual magazines	\$0.75

(Ordinary, and country members receive the *Victorian Naturalist* free of any further charge).

2. The scheme of supporting membership was introduced so that those who are able and willing to do so might help club finances. You are invited to become a supporting member by making a voluntary addition to the normal annual fee of any sum you choose, from \$10 upward. Details relating to supporting members and their payments are regarded by the treasurer as confidential, and no distinction or extra privilege is bestowed on the members concerned.

(To be removed)

Field Naturalists Club of Victoria

**FORM FOR RENEWAL OF MEMBERSHIP OR OF
SUBSCRIPTION TO THE "VICTORIAN NATURALIST"**

(To be used by existing members or subscribers for payment of fees)

Name(s)

Address

.

.

(Please indicate if there is a joint member)

Mr. D. E. McINNES

Hon. Treasurer, F.N.C.V.

129 Waverley Road, East Malvern, 3145

Dear Sir,

Please find enclosed the sum of \$, to cover annual membership fees subscription to the *Victorian Naturalist* for the year 1975. Please enter this sum as follows:

Membership fees \$
Supporting membership
Subscription to *Victorian Naturalist*
.

	Kingscote	Eastern	Northern	Southern	Flinders Chase
<i>Numenius madagascariensis</i>					
Eastern Curlew	x				
<i>Tringa hypoleucos</i>					
Common Sandpiper			x		
<i>Burhinus magnirostris</i>					
Southern Stone-Curlew					x
<i>Larus novaehollandiae</i>					
Silver Gull	x	x	x	x	
<i>Larus pacificus</i>					
Pacific Gull	x				x
<i>Hydroprogne tschegrava</i>					
Caspian Tern	x			x	
<i>Sterna bergii</i>					
Crested Tern	x	x		x	
<i>Sterna nereis</i>					
Fairy Tern				x	
<i>Phaps elegans</i>					
Brush Bronzewing		x	x		
<i>Calyptorhynchus funereus</i>					
Yellow-tailed Black Cockatoo	x		x	x	
<i>Cacatua galerita</i>					
White Cockatoo	x		x	x	x
<i>Cacatua roseicapilla</i>					
Galah	x	x	x	x	x
<i>Platycercus elegans melanoptera</i>					
Crimson Rosella	x		x		
<i>Glossopsitta porphyrocephala</i>					
Purple-crowned Lorikeet			x		
<i>Trichoglossus haematodus</i>					
Rainbow Lorikeet			x		
<i>Cacomantis pyrrhopterus</i>					
Fantailed Cuckoo	x	x		x	
<i>Chrysococcyx basalis</i>					
Horsfield Bronze-Cuckoo	x				
<i>Chrysococcyx lucidus</i>					
Golden Bronze-Cuckoo	x		x		
<i>Ninox novaeseelandiae</i>					
Boobook Owl					x
<i>Hirundo tahitica</i>					
Welcome Swallow	x	x	x	x	x
<i>Petrochelidon nigricans</i>					
Tree Martin			x		
<i>Anthus novaeselandiae</i>					
Pipit	x		x	x	x
<i>Coracina novaehollandiae</i>					
Black-faced Cuckoo-Shrike	x		x	x	
<i>Ephthianura albifrons</i>					
White-fronted Chat	x	x	x		x

	Kingscote	Eastern	Northern	Southern	Flinders Chase
<i>Acanthiza nana</i> Little Thornbill			x		
<i>Acanthiza lineata</i> Striated Thornbill	x		x		
<i>Acanthiza pusilla</i> Brown Thornbill	x	x	x	x	x
<i>Sericornis frontalis osculans</i> Spotted Scrub Wren	x	x		x	x
<i>Malurus cyaneus</i> Superb Blue Wren	x	x	x	x	x
<i>Rhipidura fuliginosa</i> Grey Fantail	x	x	x	x	x
<i>Rhipidura leucophrys</i> Willie Wagtail	x	x			
<i>Myiagra inquieta</i> Restless Flycatcher	x	x	x		
<i>Petroica multicolor</i> Scarlet Robin		x	x	x	x
<i>Pachycephala pectoralis</i> Golden Whistler		x			
<i>Colluricincla harmonica</i> Grey Strike-Thrush	x	x	x		
<i>Pardalotus xanthopygus</i> Yellow-tailed Pardalote	x			x	
<i>Pardalotus substratus</i> Striated Pardalote			x		
<i>Zosterops lateralis</i> Silver Eye	x	x		x	x
<i>Meliphaga gratitia</i> Purple-gaped Honeyeater	x			x	
<i>Meliphaga leucotis</i> White-eared Honeyeater		x			
<i>Melithreptus brevirostris</i> Brown-headed Honeyeater	x			x	
<i>Phylidonyris pyrrhoptera</i> Crescent Honeyeater			x	x	x
<i>Phylidonyris novaehollandiae</i> Yellow-winged Honeyeater	x	x	x	x	
<i>Phylidonyris melanops</i> Tawny-crowned Honeyeater					x
<i>Acanthorhynchus tenuirostris</i> Eastern Spinebill			x	x	x
<i>Anthochaera carunculata</i> Red Wattle-Bird	x	x		x	x
<i>Aegintha temporalis</i> Red-Browed Finch	x	x	x		
<i>Passer domesticus</i> House-Sparrow	x				

	Kingscote	Eastern	Northern	Southern	Flinders Chase
<i>Sturnus vulgaris</i> Starling	x				
<i>Grallina cyanoleuca</i> Magpie-Lark	x		x		
<i>Artamus cyanopterus</i> Dusky Wood-Swallow		x		x	
<i>Streptera versicolor melanoptera</i> Black-winged Currawong		x	x	x	x
<i>Gymnorhina tibicen hypoleuca</i> White-backed Magpie	x	x	x	x	x
<i>Corvus coronoides</i> Australian Raven	x	x	x	x	
<i>Alauda arvensis</i> Skylark		x		x	

Appendix 2

FLORA

Pteridophyta	Proteaceae
<i>Cheilanthes tenuifolia</i>	<i>Petrophila Multisecta</i>
<i>Pteridium esculentum</i>	<i>Isopogon ceratophyllus</i>
Gymnospermae	<i>Adenanthos sericeae</i>
<i>Callitris rhomboidea</i>	<i>Adenanthos terminalis</i>
	<i>Conospermum papens</i>
Liliaceae	<i>Hakea rostrata</i>
<i>Dianella revoluta</i>	<i>Hakea meulleriana</i>
<i>Burchardia umbellata</i>	<i>Hakea vittata</i>
<i>Anguillaria dioica</i>	<i>Banksia marginata</i>
<i>Chamaescilla corymbosa</i>	<i>Banksia ornata</i>
<i>Bulbinopsis semibarbata</i>	<i>Grevillea ilicifolia</i>
<i>Xanthorrhoea tateana</i>	<i>Grevillea halmaturina</i>
Iridaceae	<i>Grevillea pauciflora</i>
<i>Orthrosanthus floribundus</i>	<i>Grevillea quinquenervis</i>
	<i>Grevillea rogersii</i>
Amaryllidaceae	Polygonaceae
<i>Hypoxis glabella</i>	<i>Muehlenbeckea adpressa</i>
Orchidaceae	Santalaceae
<i>Thelymitria leaves</i>	<i>Choretrum glomeratum</i>
<i>Corybas leaves</i>	Chenopodiaceae
<i>Ancianthus caudatus</i>	<i>Atriplex cinerea</i>
<i>Acianthus reniformis</i>	<i>Rhagodia baccata</i>
<i>Leptoceras fimbriatus</i>	<i>Salsola kali</i>
<i>Caladenia patersonii</i>	<i>Suaeda australis</i>
<i>Caladenia filamentosa</i>	<i>Enchylaena tomentosa</i>
<i>Caladenia latifolia</i>	<i>Arthrocnemum halocnemoides</i>
<i>Caladenia deformis</i>	Phytolaccaceae
<i>Diuris longifolia</i>	<i>Gyrostemon australasicus</i>
<i>Pterostylis nana</i>	Aizoaceae
<i>Pterostylis barbata</i>	<i>Carpobrotus rossei</i>
<i>Pterostylis longifolia</i>	<i>Disphyma australe</i>
Casuarinaceae	<i>Tetragonia amplexicoma</i>
<i>Casuarina striata</i>	

Note: Due to insufficient space in this issue, the continuation of Appendix 2, together with Appendix 3, will be published in the next issue.

A New Caddis-fly Genus from Victoria and Tasmania

(Philorheithridae: Trichoptera)

by A. NEBOISS*

Abstract

A new genus, *Ramiheithrus*, is described to include two species, *R. virgatus* sp. n. from North-eastern Victoria, and *R. kocinus* sp. n. from North-western Tasmania. The characteristic feature of the genus is the pectinate antennae.

Introduction

Investigations on invertebrate fauna in the Dartmouth dam inundation area and Mitta Mitta River catchment area in North-eastern Victoria have yielded many interesting distributional records and undescribed insect species. Among them are several specimens of a caddis fly of the family Philorheithridae having unusual antennae which are pectinate on the basal half and which resemble those of another undescribed species captured earlier at Corinna, North-western Tasmania. The two species were found to be closely related, but could not be attributed to any of the described genera. A new genus, *Ramiheithrus*, is here erected to contain the two species. Riek (1970) recorded a genus with plumed antennae.

The family Philorheithridae Mosely (1936) has an entirely southern distribution. Several genera are known from Australia and Tasmania, but the fauna is far from being fully investigated. A few other genera occur in New Zealand and South America.

Adult Philorheithridae have a wing span of 15-30 mm; an indistinct but rather constant wing pattern. The adults adopt a characteristic resting pose with wings and abdomen positioned at an angle to the substrate.

Genus *Ramiheithrus* gen. n.

Type species: *Ramiheithrus virgatus* gen. et sp. n.

Ocelli absent. Antennae about as long as anterior wing, basal half pectinate in male; first segment stout, as long as vertical diameter of eye, second segment very short, both simple, the following 15 or 16 segments with long lateral branches, becoming shorter distally, the segments of apical half simple. Male maxillary palp five-segmented; there are no pilifers in front of the face. Scutum and scutellum each with a pair of rounded warts. Anterior wing without longitudinal fold, apex broad obliquely truncate; forks 1, 2, 3 and 5 present, sclerotized area on the anal margin produced to a distinct lobe. Posterior wing with Sc and R1 merged for a short distance before separating and diverging; R1 terminates into R2 shortly before wing margin; forks 1, 2 and 5 present. Male genitalia characterized by dorsally produced hood-like seg. 9 and a short bilobed plate representing the inferior appendages. Lateral pores present on sternites 2 - 8.

Spurs 2:4:4

This genus resembles *Aphilorheithrus*, but is distinguished by the wing venation, well developed anal lobe on anterior wing, and the absence of pilifers in front of the head in the male. So far only two species are known to belong to this genus.

*Curator of Insects, National Museum of Victoria

KEY FOR SEPARATING SPECIES
(males only)

1. The trilobed plate above phallus with median lobe laterally compressed, much longer than lateral lobes; anterior wing fork 1 sessile *virgatus*
The trilobed plate above phallus with median lobe semicircular, shorter than lateral lobes, anterior wing fork 1 with footstalk *kocinus*

Ramiheithrus virgatus sp. n.

sp.n.

Figs. 1-4, 6-9

Greyish brown species with irregularly mottled anterior wings, a distinct pale oval spot close to wing margin within fork 3, smaller and less conspicuous ones between the veins above and below it. Usually there are 15-16 branched antennal segments, although in some specimens there are two branches on seg. 3; the base of each lateral branch dark brown, all unbranched apical segments pale, yellowish. Maxillary palp five-segmented; seg. 1 short, apically with well developed nodule, the subsequent segments slender.

♂ genitalia with seg. 9 dorsally produced into large centrally clefted hood, inner surface on either side of the

cleft densely covered with short pointed spines. A trilobed hood-like plate covers the phallus dorsally; the median, laterally compressed lobe, longer than the lateral lobes. Phallus in lateral view triangular, pointed apically. A broad, bilobed plate constitutes fused inferior appendages, each lobe in lateral view evenly rounded.

♀ — unknown.

Length of anterior wing: ♂ 10-11 mm.

Type material: Holotype ♂ (T4558), 8 ♂ paratypes (T4559—T4566) McKay creek, Sassafras Gap, Vic. 2 Feb. 1974. A Neboiss (NMV). All specimens preserved in alcohol.

Distribution: North-eastern Victoria

Ramiheithrus kocinus sp. n.

Figs. 5, 10-12

Blackish species with faint paler irregular mottling on anterior wings, of which the most conspicuous is a pale area at, and just behind the distal end of discoidal cell. Antennae dark greyish-brown throughout with 15 to 16 branched segments. Maxillary palp five-segmented, seg. 1 short with well developed apical nodule.

♂ genitalia with seg. 9 dorsally produced into a large deeply clefted hood, inner surface of each side covered with a group of short pointed spines. A trilobed hood-like plate above the phallus; the median lobe broad semicircular, shorter than the lateral lobes. Phallus broad, apex

rounded. A broad bilobed plate constitutes fused inferior appendages; each lobe in lateral view somewhat oval with acute upper angle.

♀ - unknown.

Length of anterior wing: ♂ 9 mm.

Type material: Holotype ♂ (T4567), 1 ♂ paratype (T4568) Corinna, N.W. Tas. (small creek in forest), 5. Nov. 1972 A. Neboiss and G. Kocins (NMV). Specimens preserved in alcohol.

Distribution : North-western Tasmania.

The species is named after Mr. G. Kocins, a friend and companion on field work over many years.

Acknowledgements: s.

The author is indebted to Dr. T. New of LaTrobe University, Bundoora, and Dr. G. Ettershank of Monash University, Clayton for their constructive criticism and comments.

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Proc. Zool. Soc. Lond. 1936 395-424.
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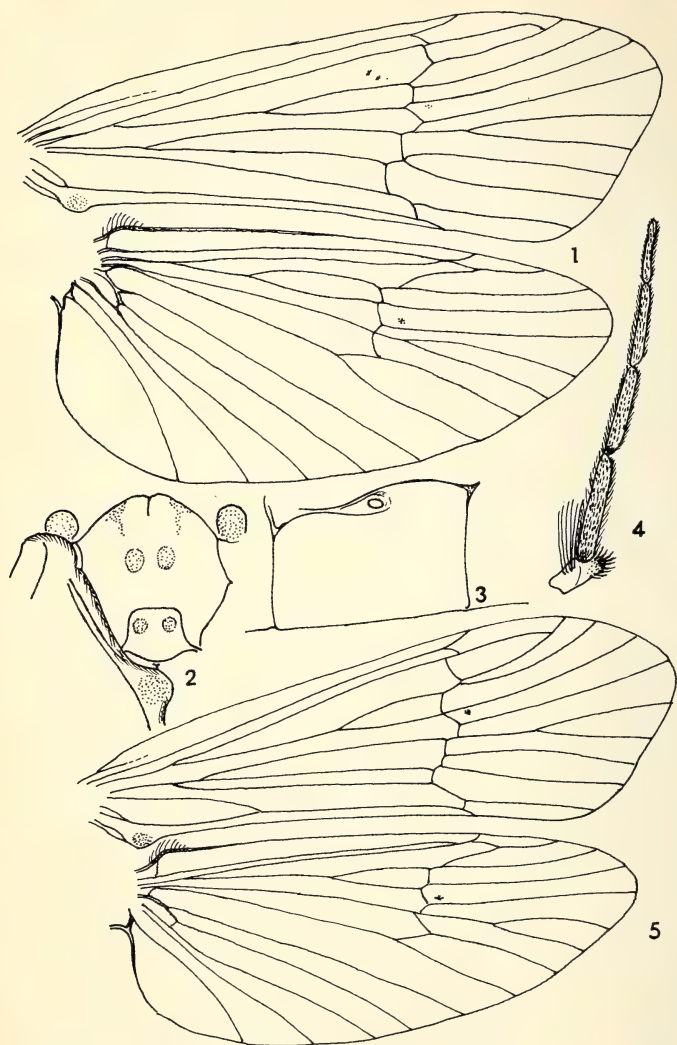


Figure A

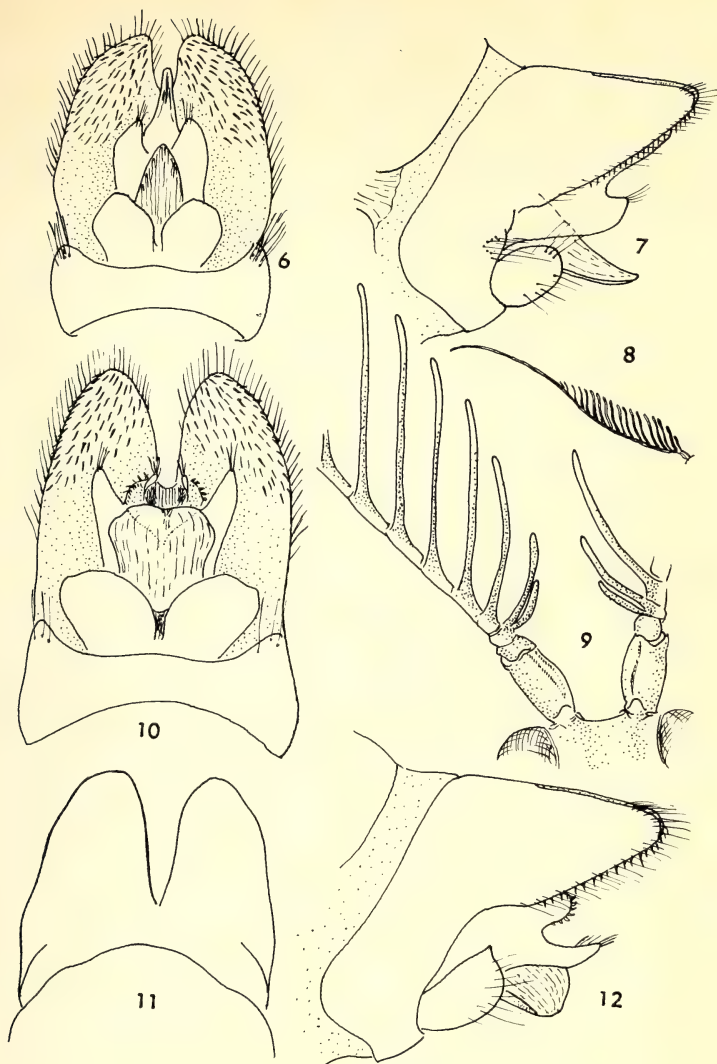


Figure B

Figure A

Figs. 1-4: *Ramiheithrus virgatus* gen. et sp. n. ♂
 1. Wing venation; 2. Scutum and scutellum showing warts and base of anterior wing with position of anal lobe;
 3. Sternite 6 showing lateral pore; 4. Maxillary palp. 5. *Ramiheithrus kocinus* sp. n. ♂ wing venation.

Figure B

Figs. 6 - 9 - *Ramiheithrus virgatus* gen. et sp. n. 6. - Male genitalia ventral; 7. - male genitalia lateral; 8. - antenna; 9. - antenna; enlarged basal section; 10-12 - *Ramiheithrus kocinus* sp. n. 10. - male genitalia ventral; 11. - dorsal outline of segment 9.; 12.- male genitalia lateral.

Notice of Annual General Meeting of The Field Naturalists Club of Victoria

To be held at The National Herbarium, South Yarra, on the 12 day of March One thousand nine hundred and seventy-five at 8 p.m.

Business

1. Approval of Minutes of Annual General Meeting held on the 13 March, 1974.

2. Presentation of Reports

3. Alteration of Memorandum and Articles of Association. To consider and if thought fit pass the following special resolution:

A. That the Memorandum of Association of the Club be amended as follows:-

1. By deleting Article 2(b) and substituting the following new Article:

"2(b) To take all steps as may be considered most effective to conserve and protect the natural environment of Australia and its environs and in particular of the State of Victoria".

B. That the Articles of Association of the Club be amended as follows :

1. By inserting the words "or full-time students under the age of twenty-five years" between the words "years" and "at" in lines 1 and 2 respectively of Article 6(c).

2. By deleting Article 20 and substituting the following new Article:

"20. An annual general meeting of the Club shall be held during the second week of March in every year at such place as the Council may determine."

3. By deleting Article 29 and substituting the following new Article:

"29. The members shall at each Annual General Meeting elect as hereinafter provided out of their own body the members of Council. Council shall consist of the President, Vice-President, immediate past President (who shall hold office till the next Annual General Meeting only) and ten other members. The meeting shall also elect the following Office Bearers, namely Secretary, Treasurer, Editor, Librarian, Excursion Secretary and other Office Bearers as determined by

Council. These Office Bearers may be honorary, or may receive such remuneration as Council considers proper, and need not necessarily be members of the Club. Members of Council may hold any position but shall not receive any remuneration. The Secretary and Treasurer shall, and other Officers may, attend Council Meetings, but shall not be eligible to vote on any motion unless they are members of Council. In the event of any of the foregoing offices or places not being filled or of any vacancy occurring therein between two Annual General Meetings the vacancy may be filled by the Council and the person so appointed may hold office until the next and subsequent Annual General Meeting. Subject to the general control of the Club the management of the business and affairs of the Club shall be vested in the Council."

4. By inserting the sentence "If no nomination has been received for any position, nominations for that position may be accepted at or before the Annual General Meeting" after the first sentence of Article 30 and by deleting the word "any" in line 6 of Article 30 and substituting the word "either" therefore and by deleting the words "of five Members" in line 7 of Article 30.

5. By deleting the word "nine" in line 5 of Article 32 and substituting the word "seven".

6. By deleting Article 40.

7. By inserting the words "or other officer duly appointed by Council, provided that at least one signatory must be a financial member of the Club" after the last word in Article 63.

8. By renumbering Articles 41 to 80 inclusive as Articles 40 to 79 respectively.

4. Election of Council and Office Bearers.

ROGER RIORDAN.

Hon. Sec.

Australian Natural History Medallionist for 1974

Vincent Noel Serventy

The Award Committee has announced that the winner of the Australian Natural History Medallion for 1974 is Mr. Vincent N. Serventy, whose name has long been familiar to naturalists and indeed most Australians as that of an outstanding conservationist, editor and telecaster in the field of natural history, and news of his success in winning this coveted award will be welcomed far and wide.

Vincent Noel Serventy was born at Armadale, Western Australia, on 6 January, 1916, twelve years after his brother, Dr. Dominic Louis Serventy, the distinguished ornithologist whose name already appears on the list of Medallionists. Like his brother, Vincent has specialised in the study of birds, his first contributions, on the birds nesting in the Abrolhos, appearing in *Gould League Notes* (W.A.), *Wild Life* (Melbourne) and *Emu* (R.A.O.U.) in the years 1941-2-3. Papers in these and other publications, including the *Western Australian Naturalist* (which he founded) continued over the years, and in 1971 appeared *Handbook of Australian Sea Birds*, in which he collaborated with his brother and J. Warham.

V. N. Serventy has extended his interests to the whole range of Australian natural history, as those who have enjoyed his long-running television series *Nature Walkabout* will not need to be reminded. His editorship, since 1967 (2 years after he moved to Sydney from Perth), of the noted conservation quarterly magazine *Wildlife in Australia* has provided him with another excellent means of furthering the love and appreciation of our native flora and fauna, as does his current editorship of *Australia's Wildlife Heritage* being published in weekly parts. He edits a

weekly nature column in the Sydney Sunday newspaper 'Sun-Herald'. His authorship of *Landforms of Australia* (1968) and *Australia's National Parks* (1969) extended this to the conservation of the physical environment. Another notable book, *A Continent in Danger*, has played a part in arousing a better awareness of the importance of ecology, and two others, *Southern Walkabout* and *Dryandra, the Story of an Australian Forest*, are entertainingly discursive and nostalgic. There is no place to mention numerous other products of his pen, but Vincent Serventy has by no means been content to be merely a writer — he has been a doer, a man who has ventured far off the beaten track, leading expeditions that have added to scientific knowledge, revivifying the numerous societies and clubs of which he has been an active member, and in many of which he has held important offices. For example, he is currently President of the Wildlife Preservation Society of Australia, which is one of the societies that nominated him for this Medallion, the others being the W.A. Naturalists' Club, W.A. Gould League, Field Naturalists' Society of South Australia, and the Gould League of New South Wales.

Mr. Serventy prepared a long, well-researched submission which he gave as evidence before the Select Committee on Conservation of the House of Representatives in 1971. If the Australian Government adopted some of his major recommendations, there would be a much more hopeful future for conservation in this country.

The Medallion was presented at the 50th Anniversary Meeting of Western Australian Naturalists' Club this December.

Field Naturalists Club of Victoria

Established 1880

OBJECTS : To stimulate interest in natural history and to preserve and protect Australian fauna and flora.

Patron:

His Excellency Major-General Sir ROHAN DELACOMBE, K.B.E., C.B., D.S.O.

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MEMBERSHIP

Membership of the F.N.C.V. is open to any person interested in natural history. The *Victorian Naturalist* is distributed free to all members, the club's reference and lending library is available, and other activities are indicated in reports set out in the several preceding pages of this magazine.

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